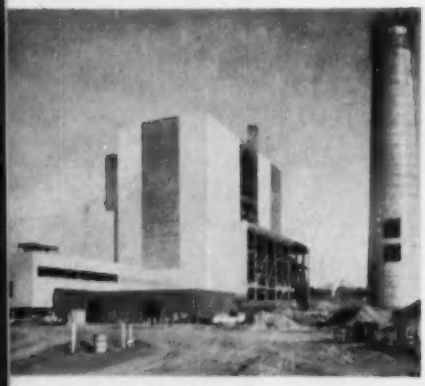
ELECTRICAL WEST

February 1955
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.



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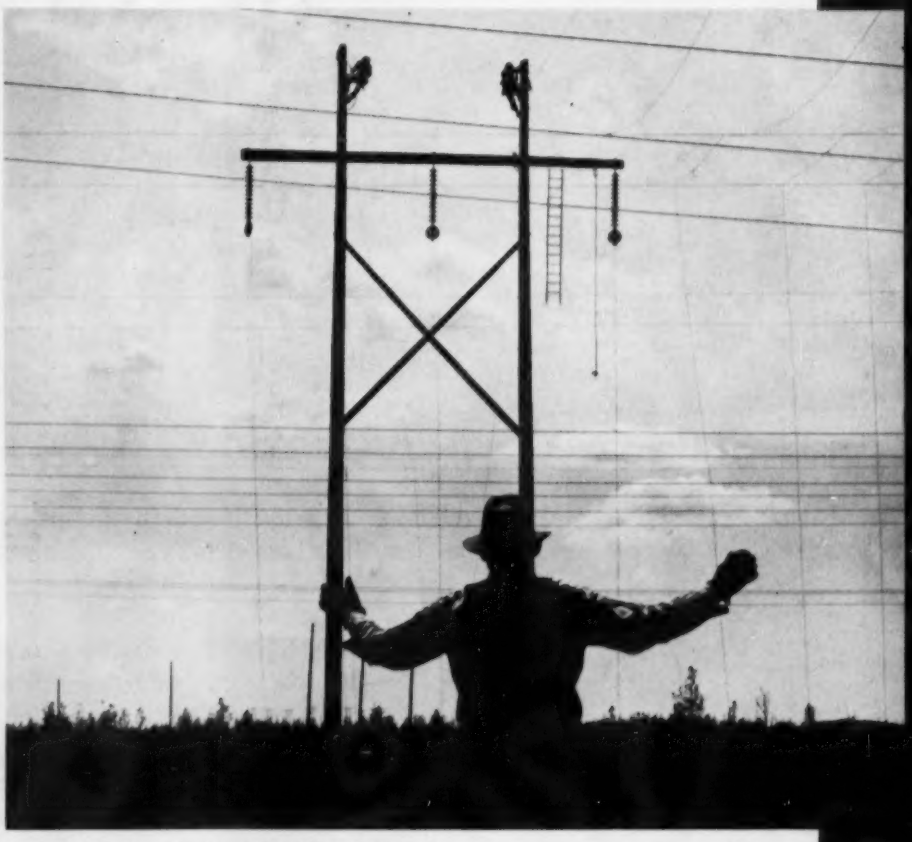
Multipurpose Hydro 100



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Western Utilities Ready for Competitive Selling Job 110

Sure as shootin'

All signs point to bigger sales of electric appliances and equipment in Edison territory from here on! Beginning this year, Edison is going all out with that target clearly in its sights, and it looks like good hunting.

That's good news, we know, for everyone who sells electrical appliances and equipment in Central and Southern California. We're tracking *your* customers—to tell them that your store is the place to buy. And our plans call for reaching them with that message where they live, where they work, where they shop, wherever they go.

"Edison tells them and the dealer sells them!" has been a key to appliance and equipment sales in this area for half a century. So alert dealers won't let the hunt pass them buy during 1955. They'll join in . . . tie in . . . and *cash* in!

Edison

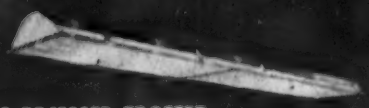
SOUTHERN CALIFORNIA EDISON COMPANY

NT-2461

efficient as the factory it lights!

INDUSTRO-LUX

MASTER FLOOD



168 RECESSED TROFFER

PM-284 COLLEGIATE

EDUCATOR

STANDARD DOME

Quality material + quality workmanship = quality Smoot-Holman lighting. This is the formula for the plant that needs to cut cost without impairing efficiency. The handsome NT-2461 Industro-Lux is sturdily built, engineered to deliver the proper lumens to a job, and scientifically designed for simplified installation anywhere. All Smoot-Holman fixtures eliminate the frequent repairs and worker errors chargeable to "bargain" lighting. Other fine Smoot-Holman equipment brings the economy of quality to office, institution and outdoor installations. Specify and install "QUALITY"— THERE IS A DIFFERENCE—

SMOOT-HOLMAN

SALES OFFICES IN MOST PRINCIPAL CITIES • BRANCH OFFICE—WAREHOUSE SAN FRANCISCO

ELECTRICAL WEST

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
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Walter C. Heston, Engineering Editor
Peggy Boyer, Associate Editor
Dale VanHorn, Assistant Editor
John Cootz, Typography

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36th Annual Review and Forecast

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Housing will increase and major construction should hold its own. Energy use up 6.2%.

Western Utilities Will Continue Expansion Programs 76
Budget figures show that 1955 spending will be only slightly less than last year, with emphasis on distribution.

Western Utilities Ready for Competitive Selling 110
Emphasis will be on load building. Outlook for business in 1955 favorable throughout the West.

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Cover photos: 230-kv tie under construction, Washington Water Power Co.; Morro Bay steam plant, Pacific Gas and Electric Co.; The Dalles Dam spillway, Corps of Engineers; baking contest, Montana Power Co.

Next Month

March articles will include these subjects: machine billing and accounting, Encina steam plant design, first aluminum transmission towers, installing cooling radiators on power transformers without untanking, above-ground pole treatment, selling a street lighting bond issue to the voters of Portland and luminous ceilings for better lighting.

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Overload indicator is quickly and easily reset by simply pushing indicating light socket up.

The L-M Transformer Overload Indicator is easily installed on transformers in service. It is secured to the transformer tank wall by a stainless-steel zigzag wire wrapped around the tank.

Maintain High Service Continuity With

L-M's New Ambient-Temperature-Compensated Overload Indicator

Accurate, economical, easy to install on transformers in service; measures tank wall temperature; provides continuous overload check without interrupting service.

W. H. ENGLAND
Application Engineer
Protective Equipment Division
Line Material Company

Line Material engineers have recognized the need for an accurate yet economical overload indicator to eliminate the costly and laborious task now required for load checking. In addition, conventional type transformers with overload indicators will eliminate the costly expense of resetting the secondary breaker on protected transformers.

We have therefore developed an indicator that assures positive overload indication, amply meets thermal, mechanical, and economical requirements, and does not interrupt service to customers.

The overload indicator is a tool which you can utilize extensively to obtain and maintain a high continuity of service. It will enable you to keep your hand on the pulse of your distribution load.

Compensates for Ambient Temperature

The device indicates thermal overloads accurately. It measures tank wall temperature (a function of top oil and hot-spot temperatures), and makes proper allowance in transformer loading for variations in ambient temperature.

The indicator is easily installed on transformers in service. It is secured to the transformer tank wall by a stainless-steel zigzag wire wrapped around the tank. On new L-M Round-Wound® transformers from the factory, the indicator is attached to a strap permanently welded to the transformer tank.

Illuminated Target

When the indicator reflects a transformer overload condition, a tube target drops, exposing and energizing a red light. The light is readily discernible in daylight as well as at night.

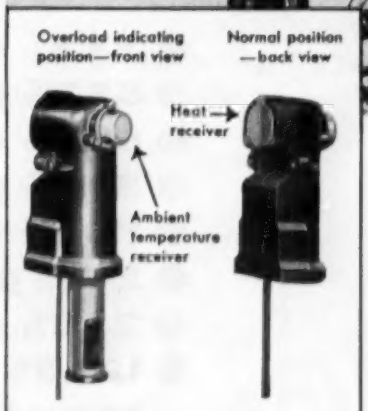
The indicator target is also available wrapped with reflecting tape, which is exceptionally brilliant and easily distinguished. This indicator without the red light does not require an electrical connection to the transformer.

Low Cost; Pays for Itself

The cost is low. The indicator will quickly pay for itself through reduction in transformer burnouts and elimination of load checks.

Get information on the L-M overload indicator today. Ask the L-M Field Engineer for bulletins and complete information; or write Line Material Company, Protective Equipment Division, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Illuminated target affords positive overload indication which is easily seen during the day or night.



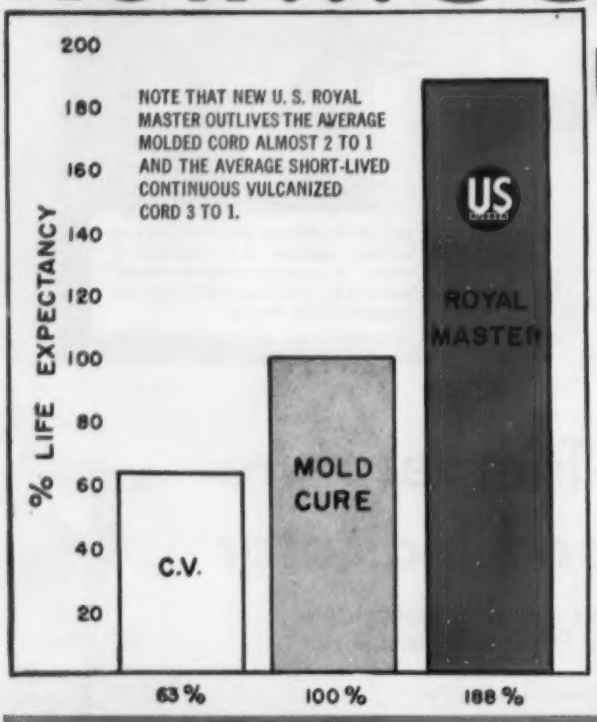
L-M Transformer Overload Indicator in normal and overload indicating positions. The metallic tank wall heat receiver is semi V-shaped to fit on any size or shape of tank.

209

LINE MATERIAL *Protective Equipment*

Now...88% longer

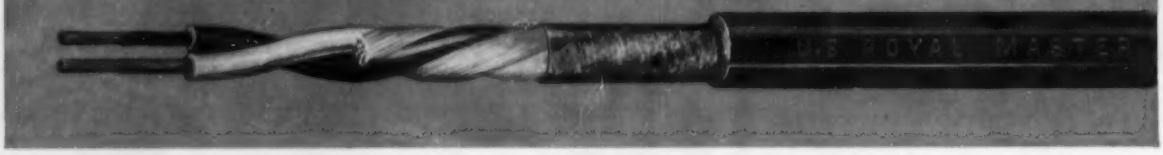
U.S. ROYAL



Chart—summarizing individual service factors weighted by their contribution to overall service life—shows new U. S. Royal Master Cord gives 88% longer life than the average of competitive molded cords.

LOOK FOR THE NAME—

U.S. ROYAL MASTER



Superior on every count!*

- 33.3% greater heat resistance
- 55.7% greater impact strength
- 53.8% greater abrasion resistance
- 30.6% greater resistance to cutting
- 110.3% greater resistance to tearing
- 21.2% greater tension or breaking strength
- 23.3% greater oil resistance
- 128.8% greater flexibility

*to the average of molded cords of other makes

US RUBBER

UNITED STATES

ELECTRICAL WIRE AND CABLE DEPARTMENT

cord life—with NEW MASTER portable cord!

Far outlasts *any* other cord made!

Service to cost ratings show new U. S. Royal Master Cord actually gives $1.88 in value for every cord dollar when compared to the average competitive molded cord!

Two years ago, "U. S." engineers began a *complete reexamination* of portable cord construction, service life, and the causes of cord failure.

Over 10,000 tests were made. More than a thousand cords of all leading makes, including our own famous U. S. Royal Cord, were analyzed, tested, and compared.

Every life factor was considered and carefully evaluated, alone and in its relation to overall cord performance and service life.

Backed by 64 years of experience in the manufacture of electrical wire and cable, U. S. Rubber engineers then translated their findings into an entirely new portable cord, designed to surpass any other previously made.

Extensive tests, both in the laboratory and in outside plant installations have proved this new portable cord startlingly superior in every respect!

New U. S. Royal Master is unquestionably the finest cord you can buy!

From every standpoint, new U. S. Royal Master is a finer, more durable cord — actually gives 88% longer life than the average of other molded cords — far longer than *any* other cord — surpassing even a *hypothetical* cord incorporating the best features of all those tested!

Far greater value, too! In spite of almost doubled service life, this great new cord is in the same price category as other molded cords—giving you $1.88 in cord value for every cord $1.00!

Prove to yourself the outstanding superiority of new U. S. Royal Master Portable Cord—in both service life *and* economy! Write address below for FREE descriptive booklet illustrating the superiority of the U. S. Royal Master Cord. And get in touch with your "U. S." distributor today!

Approved by Underwriters' Laboratories, Inc.

RUBBER COMPANY

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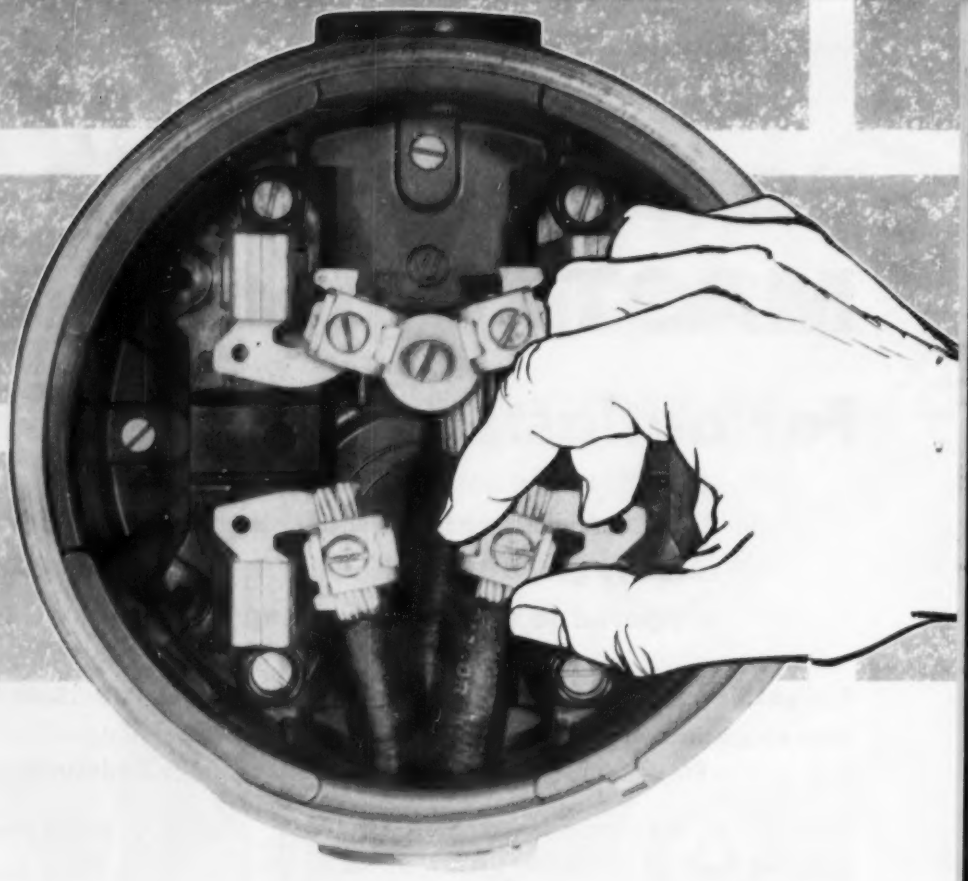


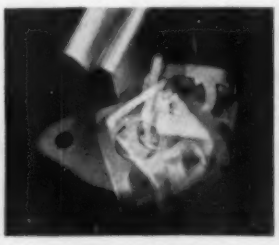
New meter socket simplifies wiring

The new Westinghouse die-cast aluminum meter socket slashes installation time because it is roomier and has self-aligning terminals which accommodate up to #0 conductors. These large conductors which are too stiff for easy bending are now being used to handle today's growing loads.

The new Westinghouse bus-type terminals swivel for easy alignment with the conductors. On installations using heavy conductors, the tops of the terminals may be removed, conductors are simply dropped into place, and the tops replaced. The swivel feature of the terminals also contributes to the ease of inserting smaller wire sizes.

The socket has outside hubs to give more room inside for wiring. Terminals have large contact surfaces with "follow" action, insuring a solid connection on aluminum or copper conductors. All sockets have a breakout in the back for use when three-point mounting is required.

A new iridited-aluminum sealing ring which can be installed without tools is supplied with this socket. The socket is available for either single or polyphase service, with 2 or 3 outlets, in 1-inch, 1¼-inch and 1½-inch hub sizes. For more information, write to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania, for a copy of B-6377. J-40461



Terminals swivel to align with conductors.

The ring can be applied without the use of tools.

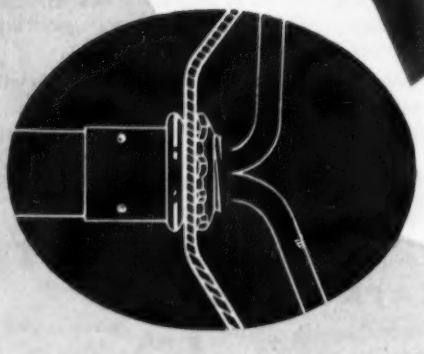
YOU CAN BE SURE...IF IT'S

Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

Red Throat

B-M 21 B, THE NEW INSULATED THROAT INDENTER CONNECTOR FOR E. M. T.



Four Ways Finer

1. Protruding rounded red plastic lip of bushing prevents cutting of insulation—eliminates shorts.
2. Full thread screws into all conduit fittings. Lip of RED THROAT bushing protects thread from damage.
3. Deep dished eight pronged lock nut is easier to drive on—screws flush to shoulder and digs into metal of box for vibration proof positive ground.
4. Permanent locked-in bushing insures smooth burr-free raceway for easy fishing. No extra work and costs no more.

Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!

ALL BRIEGEL FITTINGS ARE U. L. APPROVED AS CONCRETE-TIGHT

Order from Your Wholesaler!

All B-M Indenter Fittings are U.L. Approved as concrete-tight and for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

UL — Recognized Component

TELESCOPE BM SYSTEM

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At last A new cutout with HEAVY-DUTY PERFORMANCE that meets Standard Duty budgets

New circuit interruption technique in S&C's TYPE XS CUTOUT increases interrupting capacity, but not the cost.

Designed to meet the higher fault currents of today's distribution systems, the S&C Type XS is a standard-duty cutout with respect to distribution economics, but a heavy-duty cutout in its interrupting capacity. It has interrupting ratings which conform to those established by NEMA for certain heavy-duty cutouts—hence the XS may be applied wherever you need an open cutout.

An ingenious "recoil mechanism" is the heart of the Type XS Cutout. It presents a new approach to the problem of handling the energy associated with circuit interruption.

It makes heavy-duty performance possible without resorting to the methods used conventionally for increasing cutout capacities—heavier construction, larger bore, and double venting — methods which not only increase costs but usually sacrifice low fault current protection.

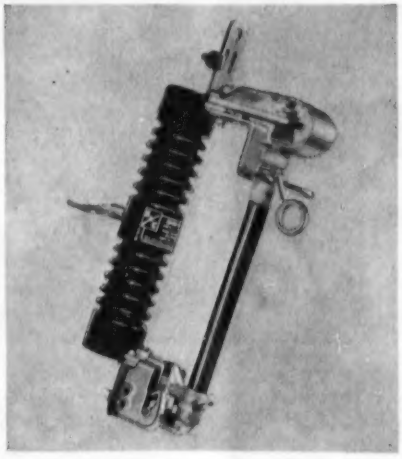
COMPARE THE CAPACITIES

The XS has an interrupting rating of 5,000 amperes (7.5 kv) and 4,000 amperes (15 kv) as compared to other standard-duty cutouts which are rated 2,000 amperes (7.5 and 15 kv).

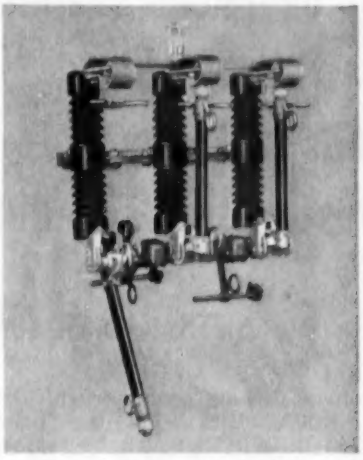
MODERN IN CONCEPT

MODERN IN DESIGN

MODERN IN APPLICATION



S&C TYPE XS CUTOUT
single-shot, birdproof



S&C TYPE XS CUTOUT
three-shot, birdproof

Complete information on the Type XS Cutout is contained in new Catalog Section 511 . . . we will gladly send you a copy.

THE TYPE XS CUTOUT

offers added advantages by eliminating:

√ the time-consuming operation of short-circuit zoning analysis to determine whether a standard-duty or a heavy-duty cutout is needed in each particular location.

√ ordering or stocking two types.

√ carrying two types of cutouts in service trucks.

√ the worry about construction crews installing the wrong cutout or tube at protection points.

S&C ELECTRIC COMPANY

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CHICAGO 40, ILLINOIS, U. S. A.

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POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

Specialists in High-Voltage Circuit Interruption

Handle with care! 200-ton load being lifted into place by MOFFETT gantry crane, built and erected for the new Valley Steam Plant of Los Angeles Department of Water and Power. Capacity of main hoist, 225 tons; auxiliary hoist, 15 tons. Main span, 45 feet; outrigger, 65 feet.

For overhead cranes that "baby" big loads and meet construction schedules, see MOFFETT

SIZES: ¼ to 650 TONS

This 408,600-pound generator, which with its turbine cost $2,000,000, is definitely a "handle-with-care" load. MOFFETT "plant individualized" cranes for public utilities are specially engineered to "baby" such loads... working with safety and efficiency both at the time power plant equipment is installed and for years to come.

MOFFETT cranes are built for quick, easy installation, too. Each crane is completely and carefully assembled in our shop, then match marked... and delivered when you're ready for it. Result: MOFFETT crane parts fit into place accurately and quickly at the job... and on schedule.

When you order a MOFFETT-designed crane, you can be sure it will meet your exact requirements. Our engineers work directly with you, giving fast personal service, designing special features where needed, such as the 65-foot outrigger shown above.

And in most cases,
MOFFETT "plant individualized"
cranes cost no more than standard designs.

Phone, write or wire NOW for consultation and quotations. No obligation

For sure, safe materials handling, specify MOFFETT "plant individualized" traveling cranes. Types include:
• continuous duty • heavy industrial duty • intermittent duty • powerhouse • standby • steel mill • gantry • special purpose

13

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10,000 Tons of Proof... in the last three years alone, we have built cranes with an aggregate capacity of 10,000 tons for such leaders as:

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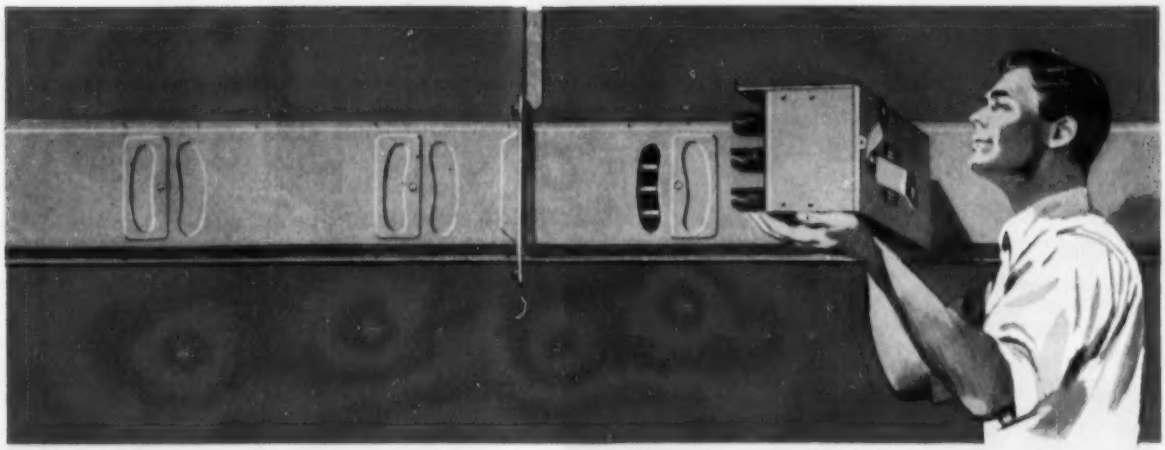
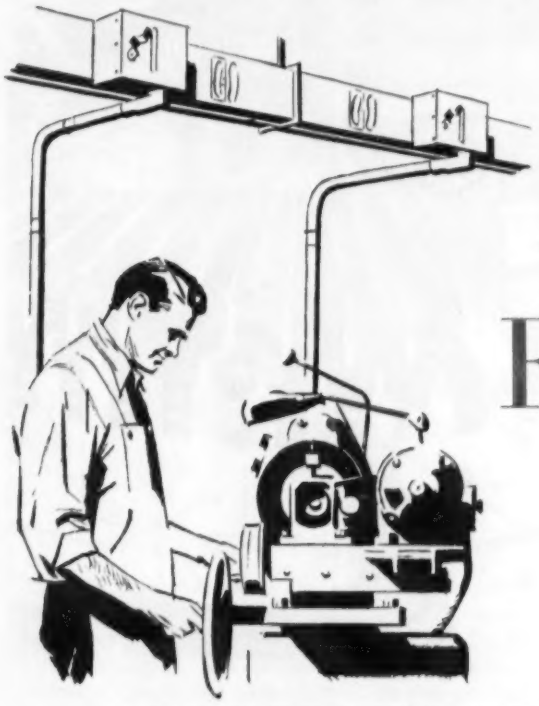


PLUG-IN POWER WHERE YOU NEED IT . . . IN MINUTES! Each section of BullDog Plug-In Duct is 10-feet long with plug-in openings on 10-inch centers. Exclusive scarf-lap construction joins sections in a rigid form. All bus plugs are fastened to casing flanges at any plug-in opening. Reinforced fingers engage bus bars for positive pressure contact.



BULLDOG PLUG-IN DUCT WITH ALUMINUM CONDUCTORS GIVES

Lightweight, Flexible Power

at low cost!

CUTS DOWNTIME! 100% REUSABLE! SAFER, MORE EFFICIENT POWER!

You are always one step *ahead* of your plant realignment or modernization plans with BullDog Plug-in Duct. It's the completely flexible, reusable electrical distribution system that provides instant plug-in power wherever, and whenever, you need it.

Simple to install, rugged plug-in duct allows circuits to be swiftly added or removed without rewiring. Downtime is eliminated. New tool setups can be made, machines shifted, entire layouts revamped, without interrupting the flow of power. Also, duct can be easily dismantled and relocated.

Whatever your power requirement, present or future, you're always prepared with BullDog Plug-in Duct. You'll find BullDog your first source for the most efficient, most modern electrical distribution equipment. See your nearby BullDog Field Engineer or Qualified Distributor. Or, write: BullDog Electric Products Company, Detroit 32, Michigan. ©BEPCO

IF IT'S NEW
. . . IF IT'S DIFFERENT
. . . IF IT'S BETTER . . . IT'S

BULLDOG

ELECTRIC PRODUCTS COMPANY

A Division of I-T-E Circuit Breaker Company

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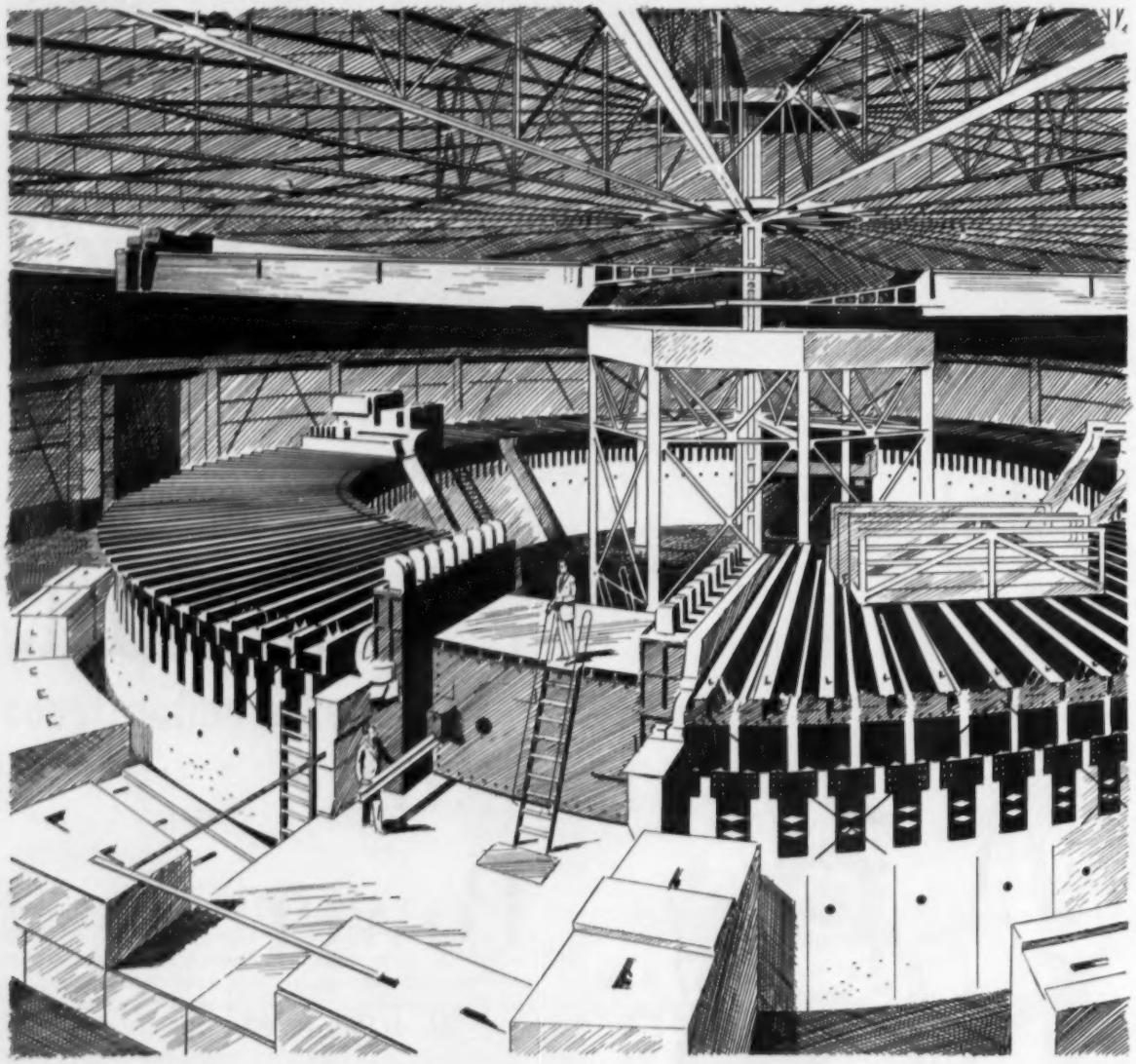
UNITED STATES STEEL AT WORK IN THE WEST—the Bevatron, most powerful atom-smasher in world



SMASHING ATOMS... with the help of steel!

You go almost beyond imagination when you talk about the Bevatron. Inside its huge magnet, nuclear particles develop a punch of 5 billion electron-volts — a speed of about 184,000 miles per second. 10,000 tons of steel went into the magnet alone. The housing, main building and cranes took many more tons . . . and by far the largest share came from the mills of United States Steel.

Yesterday, Today, and Tomorrow—Columbia-Geneva has for years helped to fill the steel needs of the West. We hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer

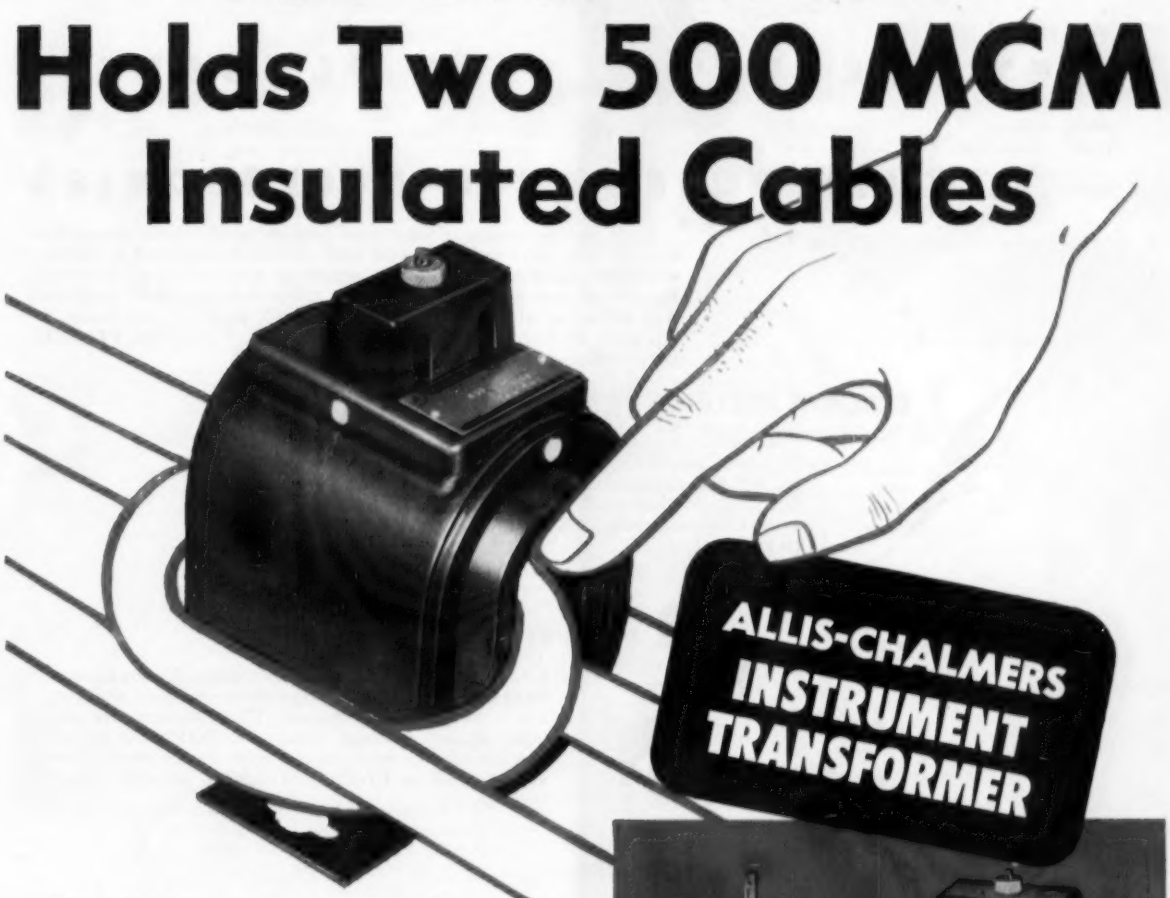
United States Steel Corporation · Columbia-Geneva Steel Division

SAN FRANCISCO · LOS ANGELES · PORTLAND · SEATTLE · SALT LAKE CITY · DENVER

USS

UNITED STATES STEEL

This Oval Window Holds Two 500 MCM Insulated Cables



Get it in any rating!

There is plenty of room for conductors in Allis-Chalmers 600-volt outdoor-indoor current transformers. Every rating has this same big oval window 1⅜ by 2¾ inches — large enough to hold two 500 MCM stranded conductors with 600-volt insulation.

In addition, units are compact and lightweight. Install them singly or in multiple, in standard instrument transformer enclosures or outdoors. You can mount them in any position — they have special provision for different methods of mounting. It is possible to get a number of ratings from a single unit by passing primary conductor through window more than once. Type TWM transformers come in the following ratings: 200 to 5 amp, 400 to 5 amp, 600 to 5 amp, and 800 to 5 amp.

Get all the facts. Ask your nearby A-C office for a copy of 61B8080 or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4546

Short-circuiting device on terminal block in open-circuited position.

Cover will fit over terminal block only if straps are turned in proper position.

Removable Short-Circuiting Device... Can be Added to Units in Service

A useful operating option has been added to Allis-Chalmers thru-type current transformers. A short-circuiting device fits the secondary terminal block: with straps turned to short-circuiting position, cover cannot be replaced. Device is supplied on all units, can easily be removed if desired. It is readily adaptable to any transformer in service.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

GET THESE 4 BIG PLUSSES

WITH PREFORMED ACCESSORIES

Since the inception of electrical transmission, many diversified devices have been designed and used on conductors and strand for dead-ending, guying, splicing, repairing and amoring. But until the Preformed Rod* was invented, there was no ONE principal way of doing all these jobs simply, easily and without tools. In addition, Preformed Accessories assure these FOUR BIG PLUSSES over ordinary accessories:

1 QUICKER INSTALLATION:

Preformed Accessories are quickly and easily applied by hand. No tools, clamps, clips, bolts or nuts are required. For example, field records of one large Western Utility show that dead-ending guys the Preformed way saves approximately 50% in labor . . . saves at least 20% in material.

2 "VELVET-GLOVE" GRIP:

Only Preformed Accessories assure the maximum in large-area, low-radial-pressure contacts without any concentrated pressures. These devices are not compression fittings; their PREFORMED spiral pitches tightly and snugly grip the conductor or strand with a UNIFORM lasting fit that never loosens.

3 LONGER CONDUCTOR LIFE:

Preformed Accessories banish lightning pitting or arc-over of conductors at or near support points . . . substantially reduce conductor stress to minimize vibration fatigue . . . prevent wear by chafing or fretting. Preformed Accessories assure the longest satisfactory transmission and distribution line life.

4 NEATER APPEARANCE:

Preformed Accessories are just as neat as the conductor or strand to which they are applied. In appearance, they are just another layer of the conductor or strand. Their smooth contour blends so well into the overall assembly that they can hardly be seen from a distance of a few feet.

PROGRESSIVE IDEAS . . . backed by EXTENSIVE RESEARCH and SOUND ENGINEERING insure the ultimate in FIELD PERFORMANCE

PREFORMED LINE PRODUCTS COMPANY

5349 ST. CLAIR AVENUE, CLEVELAND 3, OHIO

TELEPHONE CLEVELAND EXPRESS 1-3571

1

ARMOR RODS

are for reinforcing the conductor and protecting it from damage caused by vibration, chafing, arcover, concentrated clamp and tie-wire stresses, etc.

2

LINE GUARDS

of Metal protect conductors against clamping and tie-wire damage or arcover burning where vibration isn't a serious problem. Either metal or plastic Line Guards are ideal for protection of covered wires against abrasion.

3

"ALUMINUM-GRIP" DEAD-ENDS

make it easy to dead-end the bare-neutral or covered types of service drops both at the house and at the pole. These dead-ends assure low first cost, easy application and a neat appearance where it counts most.

4

PREFORMED "GUY-GRIPS"

assure the fastest, most economical and most efficient means of dead-ending guys . . . save about half the steel strand usually required . . . will not slip . . . are stronger than the strand itself.

5

PATCH RODS

are designed to restore the strength and full conductance to aluminum and ACSR conductors where damage does not exceed 25% of the outer strand layer.

6

PREFORMED LINE SPLICES

average 40% more conductivity than the unbroken conductor and are stronger than the original conductor.

7

DEAD-ENDS

The legs of a PLP Dead-End, when wrapped around conductor or strand, either bare or covered, assure a gripping strength great enough to break the strand or conductor without slippage.

8

TAP ARMOR

These short lengths of Preformed Rods eliminate troublesome concentrations of stresses . . . prevent arcing damage to the conductor . . . and guard against loosening of the tapping clamp.

*** Preformed Armor Rods are manufactured under Patent Nos. 2,275,019 and 2,587,521 . . . other patents pending.**

SALES REPRESENTATIVES

C. B. Anderson Co., *Tulsa* **• Bergstrom-Verbarg Co.,** *Minneapolis* **• Vincent J. Brown Co.,** *Buffalo* **• Burns Electric Co.,** *Pittsburgh* **• Earl S. Condon Co.,** *Los Angeles* **• Cory and Crum,** *Indianapolis* **• The Electrical Distributors Co.,** *Philadelphia* **• Engineer Sales Co.,** *St. Petersburg* **JSG Electric Co.,** *Chicago* **• E. L. Flowers,** *Boston* **• George R. Horne & Co.,** *Dearborn* **• Johnson Sales Co.,** *Bay City* **• H. L. Macon & Co.,** *Atlanta,* **Peterson Co.,** *Denver* **• Elgin B. Robertson, Inc.,** *Dallas* **• Elgin B. Robertson Co.,** *Houston* **• K. M. Ryals Co.,** *San Francisco* **• Shaffer and Nelson,** *Portland, Seattle, Spokane* **• M. H. Snyder & Sons,** *New York* **• Curtis H. Stout,** *Little Rock, Memphis, New Orleans* **• L. G. Wendegatz,** *Kansas City*

YOU MAKE PROFITS GROW WHEN YOU MAKE MINUTES COUNT

Just what is profit?

Simply stated, it's what you have left *after* you pay for materials AND labor.

Material costs are generally constant. It's TIME that makes the difference! And, that's one of the big differences—all in your favor—you'll find in Day-Brite fixtures. They're engineered to save your installation time—to help you make a bigger profit! That's the actual on-the-job experience of thousands of electrical contractors all over the United States.

Think of this, too: The time you save on one job enables you to move on faster to the next—where you'll again save more time when you install Day-Brite fixtures. And, of course, again make more profit! ... Remember, also, that every Day-Brite job is a job well done—it fully backs you up in building a reputation that leads to added business and added profits!

This is not just "sales talk"—you can prove it if you SEE, EXAMINE and COMPARE Day-Brite installation costs with those of other fixtures.

A FEW DAY-BRITE TIMESAVERS THAT HELP YOU MAKE DOLLARS OUT OF MINUTES

TIMESAVING ADJUSTABLE "A-J*" HANGER... Reduce installation time on hard-to-work with, uneven ceilings. Swivel fitting and 1⅛" hand-operated vertical adjustment let you lay in your fixture run, trim it up later... No field assembly of screws, bolts or locknuts is required. "A-Js" give you a quick, simple, foolproof way to save time and increase profit.

*PATENT NO. 2448736
UNDERWRITERS APPROVED. TM REG. U.S. PAT. OFF.

TIMESAVING HYDEE HANGER**... Easy, low-cost way to hang chain-suspended fixtures. Connect wires to receptacle—fits standard 4" or 3¼" outlet box or plaster ring... Screw hanger to outlet box—only two screws needed. No centering, no punching, no drilling. Screwdriver only tool needed... Hang the fixture and plug it in—that's all!... Use Hydees—save time, increase profit!

**PATENT NO. D-141084 AND NO. 440914.
UNDERWRITERS APPROVED. TM REG. U.S. PAT. OFF.

OTHER TIMESAVING DAY-BRITE FITTINGS

Sliding Clamp Hanger Fittings... Twin-stem Hangers (8"and 24" lengths) ... Ice-Tong Hanger Clamps.

Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Mo.... In Canada, Amalgamated Electric Corp., Ltd., Toronto 6, Ont.

SEE YOUR DAY-BRITE DISTRIBUTOR

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

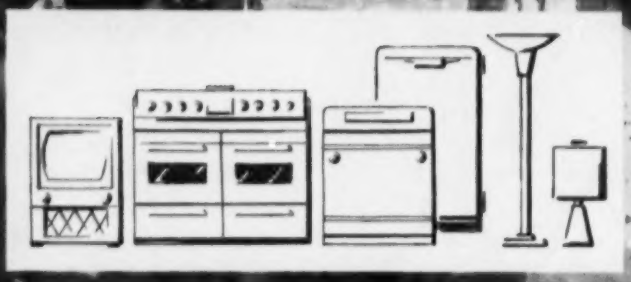
5412

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

1955 Present-day meters handle residential loads ranging up to 30-40 amperes. In next ten years, this will be greatly increased.

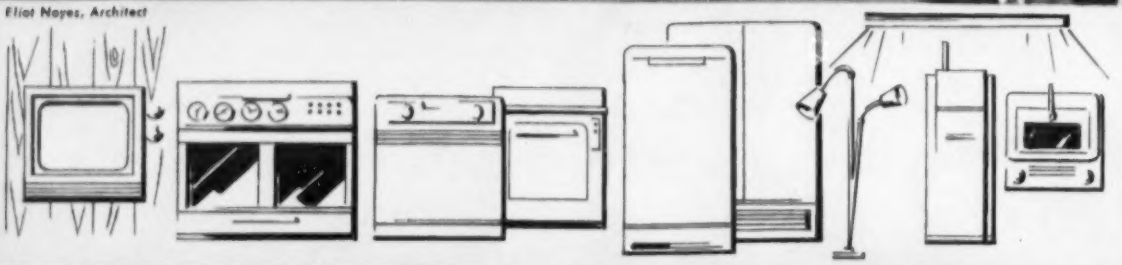
NEW General Electric I-55 Watthour Meter

1960 ten years, this will be greatly increased.



1965 Loads will more than double. New appliances will necessitate new meters like the G-E I-55 meter, capable of measuring up to 100 amps.

Eliot Noyes, Architect



NEW General Electric I-55 Watthour Meter Offers Straight-line Accuracy up to 100 Amps

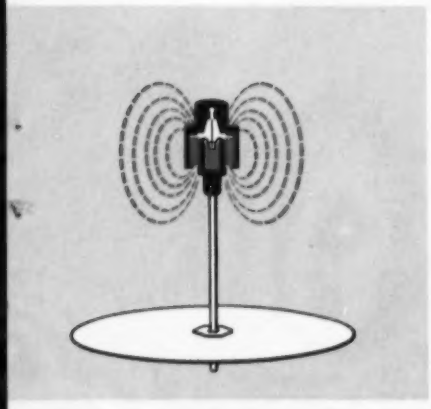
New meter, designed for future loads, retains all the features of the proven I-50 meter family

General Electric's newest addition to the I-50 meter family, the 15-ampere I-55 watthour meter, combines straight-line accuracy up to 100 amps with all of the proven features inherent in each I-50 design.

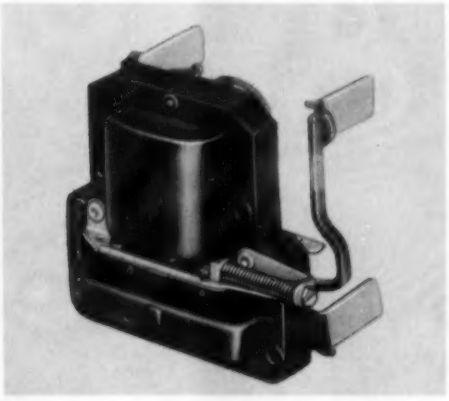
Designed for the increasing loads of the future, the new I-55 meter is *factory certified* for accuracy and performance . . . offering you the same dependability and savings so long associated with the original I-50 meter.

All of the outstanding qualities of the established I-50 family have been retained in the new G-E meter: rigid unit construction of all parts, magnetic suspension of the rotor, unique retarding system, highly legible registers. These cost-saving features have been proven by the more than five million I-50 meters in service today. For more information on the new I-55 meter, write for the new descriptive bulletin "G-E I-50 Meter Family," GEA-6071 to: Section 621-1, General Electric Company, Schenectady 5, N. Y.

I-50 METER FAMILY . . . DESIGNED TO LOWER YOUR METERING COSTS



MAGNETIC SUSPENSION system eliminates bearing wear, keeps maintenance cost to a minimum.



UNIQUE STATOR DESIGN of unit construction eliminates any changes in calibration. Butyl-molded current coil assures accurate, reliable operation.

INCREASED LEGIBILITY is assured in both the low-friction cyclometer and pointer-type registers.

Progress Is Our Most Important Product

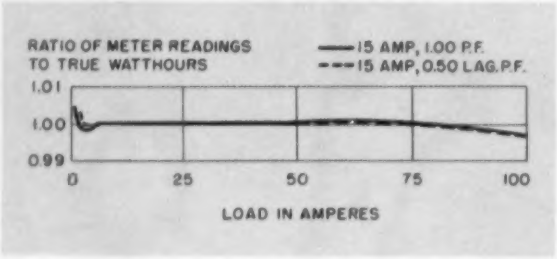
GENERAL ELECTRIC

New G-E I-55 Watthour Meter...

STRAIGHT-LINE ACCURACY UP TO 100 AMPS

Capable of accurately measuring loads up to 100 amperes, the new G-E meter has been designed to accommodate the projected doubling of loads in the next ten years.

With this straight-line accuracy, the I-55 meter offers greater versatility, longer life, more economical operation.



FACTORY CERTIFIED FOR ACCURACY AND PERFORMANCE

The new I-55 meters offer *certified* accuracy and *certified* performance.

The gold seal of certification is your assurance that each General Electric I-55 meter has met the rigid, quality-control standards and is factory certified . . . your key to lower metering costs.

Progress Is Our Most Important Product

GENERAL ELECTRIC

From the magic mineral

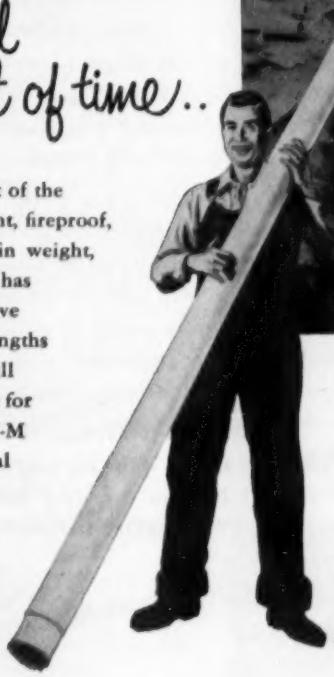
...ASBESTOS

come these strong, durable

TRANSITE DUCTS

made to stand the test of time..

Transite* meets every requirement of the ideal duct material. It is permanent, fireproof, corrosion resistant, strong, light in weight, smooth-bored, non-inductive, and has rapid heat dissipation. No protective coating is required. The 10-foot lengths are rapidly assembled. Transite will outlast other duct materials. Write for new, free brochure showing how J-M Transite Ducts can effect substantial savings in both installation and maintenance of cable subways. Address Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay St., Toronto 1, Ontario.



Available In Two Types:

TRANSITE CONDUIT

Thick walled, used for exposed work, or buried without concrete casement saves time, labor, materials.

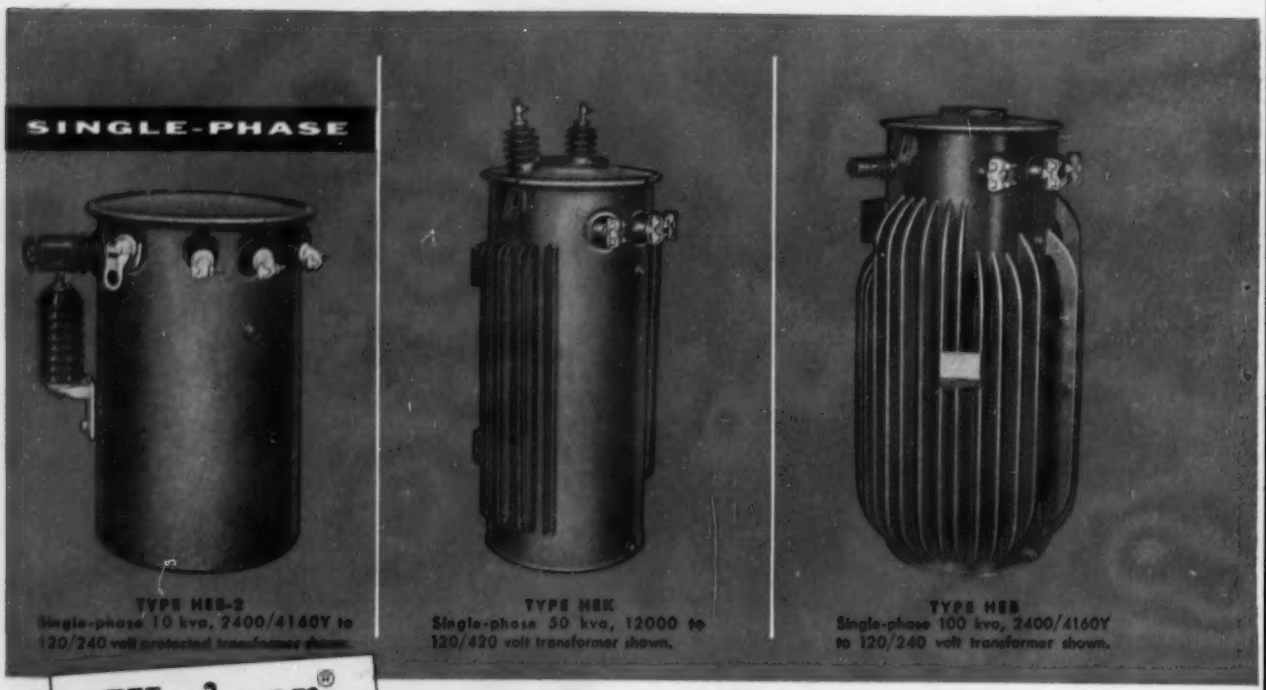
TRANSITE KORDUCT

Thinner walled for installation in concrete. Used for high-voltage lines, its high thermal conductivity cuts operating losses.

JM PRODUCTS

Johns-Manville

*Trade mark registered


SINGLE-PHASE
TYPE HSB-2
Single-phase 10 kva, 2400/4160Y to 120/240 volt protected transformer shown.
TYPE HSK
Single-phase 50 kva, 12000 to 120/420 volt transformer shown.
TYPE HSB
Single-phase 100 kva, 2400/4160Y to 120/240 volt transformer shown.

Wagner®
TRANSFORMERS
...the choice of leaders in industry

When it comes to

WAGNER WILL MEET YOUR REQUIREMENTS!

The Wagner line of Distribution Transformers, that meets *all* EEI-NEMA Standards—will also meet *all your* requirements, no matter how varied they may be. Wagner Distribution Transformers are available in all standard kva ratings and voltages.

If you want a 3 kva, pole-type transformer—Wagner has it. If you want a 150 kva, vertical-type transformer, Wagner has it, too. But these are requirements more in the nature of specifications. We're sure you have *other* requirements for the transformers you buy—such as dependability . . . long service-life . . . maintenance-free performance. Setting high standards for quality materials and careful workmanship are *additional* requirements met by Wagner Distribution Transformers.

Then there are the *extra* features of Wagner Distribution Transformers . . . like the Wagner Shur-Seal Clamping Ring, the high voltage sidewall bushing, the locked low voltage bushing and the Wagner Form W element. *All* Wagner Distribution Transformers are filled with inhibited oil to reduce oxidation and retard the formation of acids and sludge.

You get quick delivery, too. Wagner's expansion program has provided a new plant, devoted exclusively to the manufacture of transformers, to help meet the growing demand for Wagner Transformers. In addition, Wagner has a nationwide organization to provide fast, convenient service—with branches in 32 principal cities.

Get in touch with your nearby Wagner branch today. Write for your copy of Bulletin TU-180. It gives complete information on Wagner Distribution Transformers.

TYPE HPK
Three-phase 225 kva, 7200 to 240 x 480 volt transformer shown.

TYPE HPB (Vertical)
Three-phase 112.5 kva, 2400 to 208Y 120-volt transformer shown.

TYPE HPB
Three-phase 75 kva, 2400 to 240 x 480 volt transformer shown.

Distribution Transformers...

HIGH VOLTAGE SIDEWALL BUSHING

This high voltage sidewall bushing permits *faster* connections because the conductor is simply pushed into the connector and tightened with a few turns of the knob... *easier* because no tools are needed... are *safer* because the knurled knob is insulated to protect the lineman from accidental shock.

LOCKED LOW VOLTAGE BUSHING

These bushings are keyed to prevent rotation. The porcelain is keyed to the tank and the metal stud is keyed to the porcelain. There can be no loose connections on the inner end of the terminal studs because it is impossible for these studs to turn when the terminals are being tightened.

SHUR-SEAL COVER

Covers of pole-type transformers with round tanks are sealed to the tank with the Wagner Shur-Seal Clamping Ring. "Breathing" is completely prevented and no loss of oil can occur at any time. The Shur-Seal ring maintains equal pressure all around the cover—yet the cover may be easily removed by loosening a single, stainless steel bolt.

Wagner FORM W ELEMENTS

All Wagner single-phase distribution transformers in ratings 500 kva, 15 kv and below, are furnished with Wagner Form W core and coils which permit a liberal design in small size, lightweight transformers and which give excellent electrical performance.

T55-4

WAGNER ELECTRIC CORPORATION
6381 Plymouth Ave. • St. Louis 14, Mo., U. S. A.

Wagner Electric Corporation EST. 1891

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

Standard Engineer's Report

CASE HISTORY

PRODUCT *Calol Multi-Service Oils*

FIRM *Pacific Gas and Electric Company*

No compressor deposits in 10,337 hours work!

ORIGINAL CHARGE OF CALOL MULTI-SERVICE OIL still keeps these 8 Clark compressor engines clean and lubricated after 2 years or 10,337 hours operation. There is no appreciable wear on parts, oil shows no deterioration, and neutralization number was only 0.55 at last test. These engines are in P. G. and E.'s Kettleman Hills, California, compressor station on the "Super Inch" gas line.

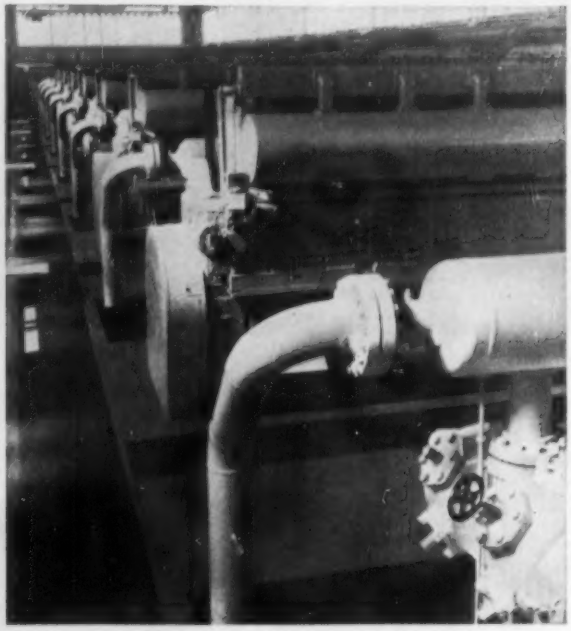
NOTE PERFECTLY CLEAN CONROD, CRANK and baffle—photographed through inspection hole. All parts are free of lacquer and deposits. Calol Multi-Service Oil in these engines also lubricates compressor cylinders, journals, and crankpins.

FREE CATALOG: "How to Save Money on Equipment Operation" will be sent on request to Standard Oil Company of California, 225 Bush Street, San Francisco.

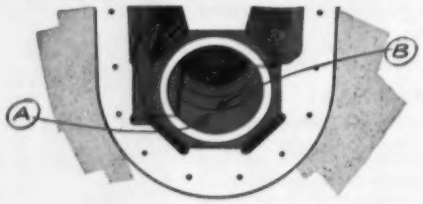
FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative, or write to 225 Bush Street, San Francisco, California.

CALOL

TRADEMARK "CALOL" REG. U. S. PAT. OFF.



How CALOL Multi-Service Oil cuts costs in all types of compressors



In crankcase and on cylinders, Calol Multi-Service Oil reduces wear and oil consumption—has cut consumption 20% in air compressors.

A. Oxidation-resistant compounds prevent formation of varnish. Detergent keeps contaminants suspended in oil, prevents foam.

B. Special compound assures "hot-spot" lubrication...covers surfaces rapidly. Calol Multi-Service Oils also recommended for pumps, diesel engines, enclosed gears.

STANDARD OIL COMPANY OF CALIFORNIA

IN EVERY LINE OF DUTY . . .

M.I.F. POLE HARDWARE MEANS DEPENDABLE PERFORMANCE

Each M.I.F. Pole Hardware Specialty was designed to do a better job than had ever been done before. There is convincing proof of duty well performed on transmission and distribution lines from coast to coast. M.I.F. Pole Hardware can be depended upon to improve performance, simplify inventory and provide longer service life.

MALLEABLE IRON FITTINGS CO.

Pole Hardware Division Branford, Connecticut

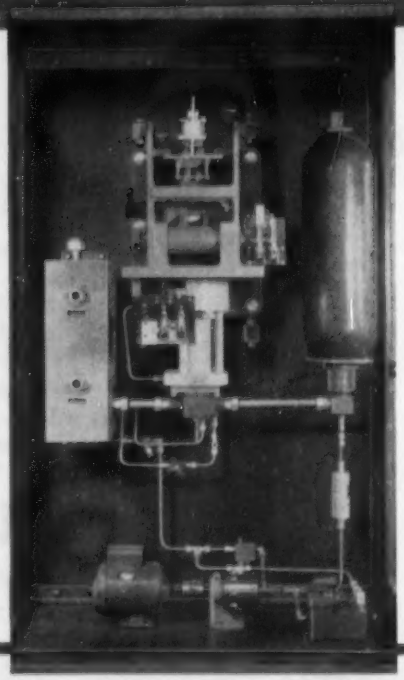
N.Y. Office: 30 Church St. Boston Office: 250 Stuart St.

Canadian Mfr. & Dist.: LINE & CABLE ACCESSORIES, Ltd. TORONTO

MIF

Representatives: William J. Cottrell Co., Portland, Ore. • James H. Drew Corp., Indianapolis, Ind. • Industrial Engr. & Equip. Corp., Los Angeles, Cal. • JSG Electric Co., Chicago, Ill., Lee-Smith Co., Miami, Fla. • B. H. McCoin, Knoxville, Tenn., • William J. O'Brien, Memphis, Tenn., • Robert P. Smith & Co., Jacksonville, Fla. • E. A. Thornwell, Inc., Atlanta, Georgia • J. P. Voight, Summerville, S.C. • Waltham, DeWitt & Krusi, San Francisco, Calif. • L. G. Wendegatz, Kansas City, Mo. • Williamson Sales Co., Shreveport and New Orleans, La.; Dallas and Houston, Tex. • O. C. Witte Co., Detroit, Mich.

Pneu-Draulic already in use on

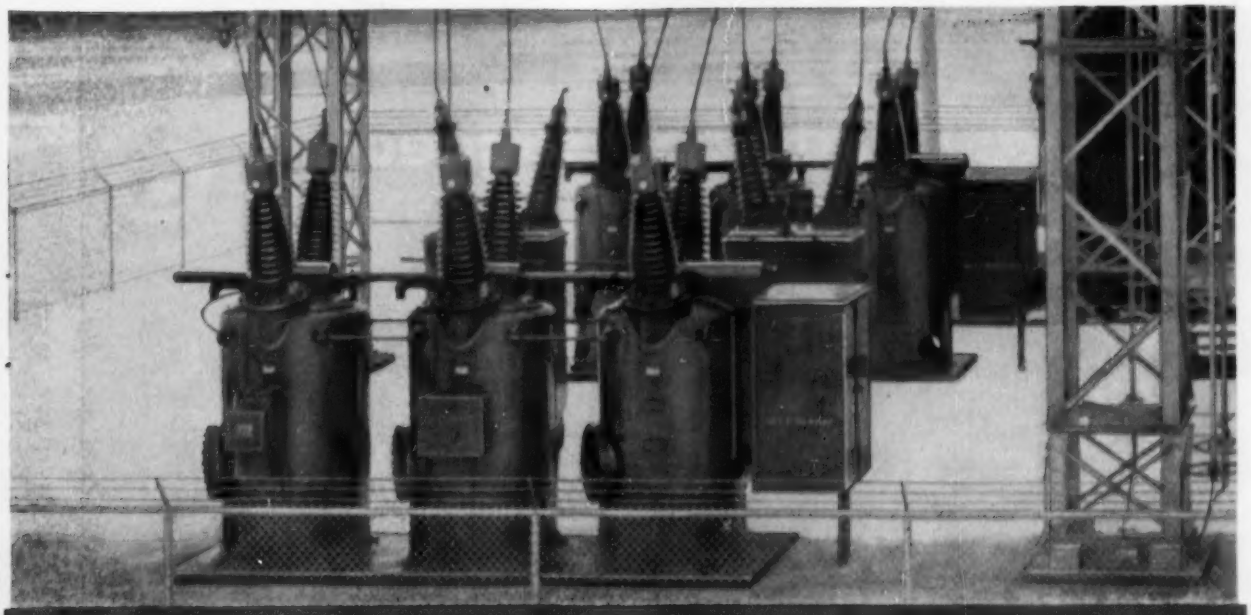


Here's the story of the remarkable acceptance of this new principle of operation. Not only are 15 systems now using breakers with *Pneu-Draulic* operators, but within six months this figure will be doubled.

Acceptance is based on the fact that the *Pneu-Draulic* operator looks simple . . . and is simple. It eliminates the mechanical problems inherent in previous designs. Call your nearby A-C office for information, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4568

Pneu-Draulic is an Allis-Chalmers trademark.

ALLIS-



Operators 15 power systems

Check these 7 reasons why you too should insist on breakers with Pneu-Draulic operators

1 Simple — Has fewer parts than other types of operating mechanisms.

2 Unaffected by Temperature — Whether it's hot or cold, the energy stored in the system provides more than standard number of operations. Use of oil with constant viscosity over wide range of temperatures insures uniform performance.

3 Eliminates Moisture and Corrosion Problems — Entire system is filled with oil containing inhibitor which eliminates rust, freezing and corrosion.

4 No Dust Problem — Offers protection of a sealed system. Efficient filtering eliminates dust and dirt problems.

5 Fast — Actually could be set to operate at speeds far faster than present useful speeds.

6 Emergency Closing — Can be closed at full speed onto energized line even when no control power is available.

7 Mechanically Trip-Free—Simple mechanically trip-free mechanism, proven on other Allis-Chalmers high speed breakers, has been adapted to the *Pneu-Draulic* operator.

CHALMERS

A-C ALLIS-CHALMERS

Ready and tagged for YOU!
WHY YOUNGSTOWN BUCKEYE CONDUIT IS BETTER
Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—your insurance that each length of "Buckeye" is made of top-grade steel.
Call your Youngstown Distributor

Youngstown

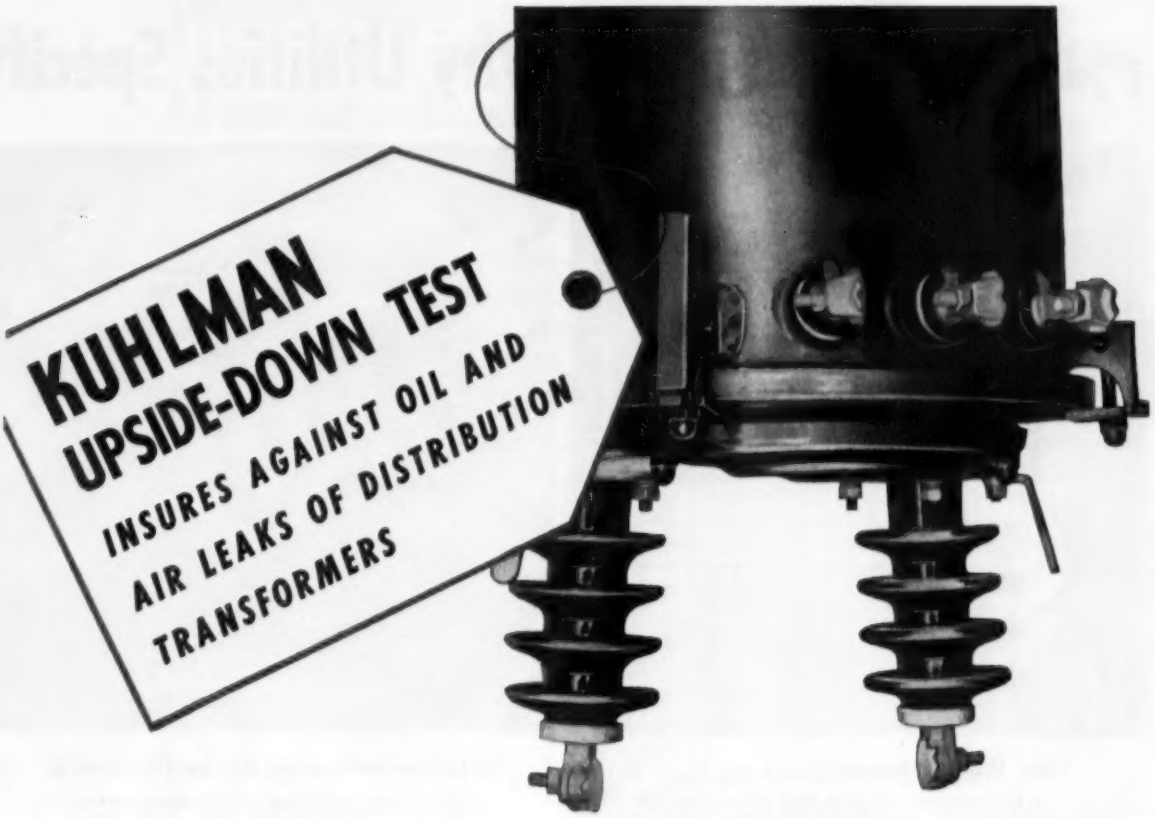
BUCKEYE QUALITY YOUNGSTOWN SERVICE CONDUIT

● Whenever you call your Youngstown Distributor for Youngstown Buckeye rigid steel conduit, your order is made ready and tagged for fast delivery to you. Service is quick and sure—an important factor in helping you keep your jobs on schedule. Save time and trouble — call your Youngstown Distributor next time you need good steel conduit.

THE YOUNGSTOWN SHEET AND TUBE COMPANY Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES



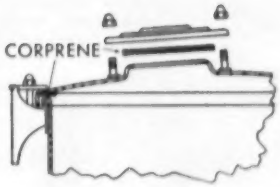
In addition to the thorough and exacting tests required by NEMA Standards*, all KUHLMAN Distribution Transformers up to 50 KVA receive a special upside down test, followed by a pressure test for air-tight, leak-free operation. First, the transformer is rotated 360° in a vertical plane to make sure there are absolutely no oil leaks, particularly in the vulnerable spots above the normal oil level line, where leaks are almost impossible to detect with the transformer in an upright position. Then a pressure test under simulated operating conditions prior to shipment provides a final check against oil and air leaks. Transformers above 50 KVA are pressure tested and checked for oil and air leaks with an electronic leak detector. KUHLMAN also spot tests all distribution transformers for impulse, audible noise, radio noise, and power factor in addition to NEMA requirements.*

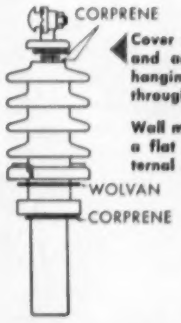
*KUHLMAN Distribution Transformers are tested as required by NEMA Standards for:

- winding resistance
- ratio
- polarity
- phase relation
- no load loss
- exciting current
- impedance
- load loss
- temperature
- applied potential and induced potential

Here is why KUHLMAN Distribution Transformers are air-tight, leak-free and moistureproof:

Cover and hand hole cover corprene gaskets are under constant uniform pressure insuring a permanent air-tight seal.





Cover mounted bushing gaskets have a flat seat and are held in place and protected by overhanging flanges of the bushings. Compression is through external clamps.

Wall mounted bushing gaskets are also seated on a flat surface and compressed by tightening internal nuts on bushings.

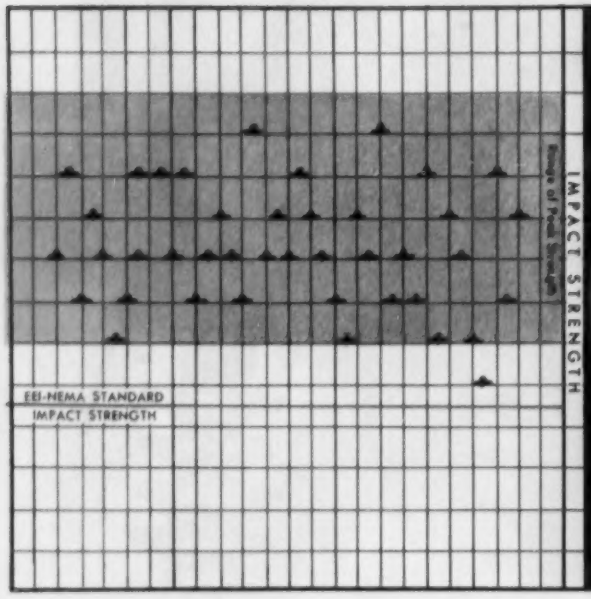
166

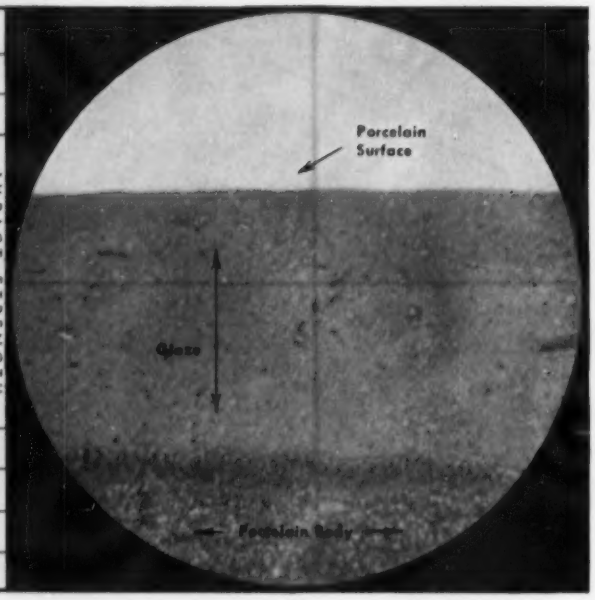
KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

DISTRIBUTED BY **MAYDWELL & HARTZELL, INC.** • SEATTLE • SPOKANE • PORTLAND • SAN FRANCISCO • LOS ANGELES • PHOENIX

6 Reasons Why Utilities Specify



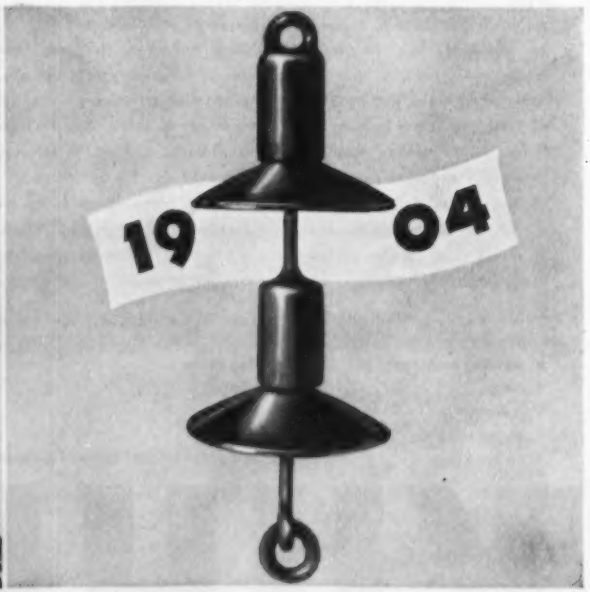


1. No Weak Sisters

AIEE standard tests show 98% of 10' MICRO-GLAZE® insulators tested fall within range of "peak impact strength." Representative industry samples tested were below this range.

2. Micro-control of Glaze Thickness

By precisely controlling glaze thickness (shown in photomicrograph of insulator surface section), Locke develops peak porcelain strength in production of suspension insulators.



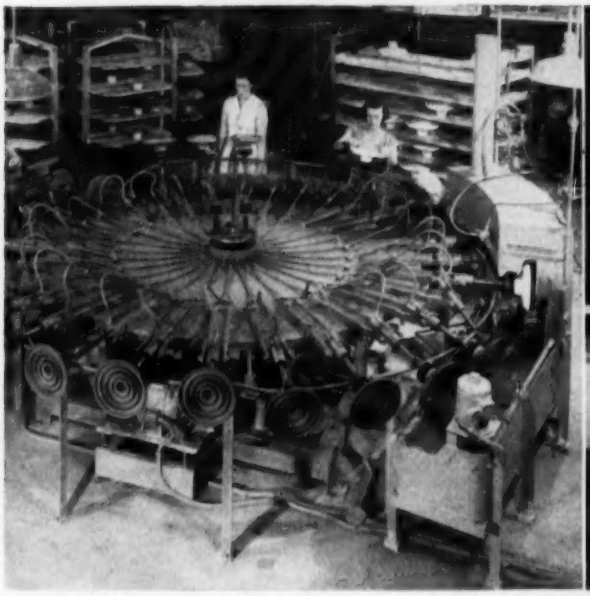
5. Less Chance of Damage

By installing Locke Microglaze® Suspension Insulators, utilities invest in extra protection against damage in transport and installation, as well as against malicious damage of transmission lines.

6. Half Century of Service

Since 1904 Locke suspension insulators have served dependably on power lines throughout the world. Half a century of outstanding product development stands behind Locke Microglaze® Suspension Insulators.

Locke MICROGLAZE Suspension Insulators



3. Precision Glazing

As insulators spin their way around this machine, they are cleaned, moistened, glazed exactly alike. With other controls, this assures uniform appearance, top strength, uniform reliability.

4. Highest Impact Resistance

Standard Impact Tests were pioneered by Locke. Hammer blows of increasing severity prove the standard impact rating is an understatement of the true strength of MICROGLAZE* suspension insulators.

Do as more utilities are doing every day--specify LOCKE Microglaze* Suspension Insulators

LOCKE

LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND

*Trademark of General Electric Company

Porcelain Products' service mast KIT

Everything furnished

but the house and conduit

for

Ranch type homes

Available Now!—a Service Entrance Mast kit complete to every detail—including roof flashing. Even necessary bolts, nuts, lag screws, and nails. These articles make up the new Porcelain Products' service mast kit that you'll put up and forget. All components of the kit can be *installed by an electrician, with electricians' tools.*

Here is a list of the parts:

- √ 1¼" UL approved Service Entrance Cap
- √ 1¼" to 2" Bell Reducer to adapt service cap to conduit
- √ Galvanized Roof Flashing and Storm Collar
- √ Roof Mounting Plate of new and original design
- √ Conduit hanger with 2¼" lag screw attached
- √ Slip-fitting offset reducer with interior grounding device
- √ All necessary bolts, nuts, lag screws and nails
- √ *Plus*—Porcelain Products famous 2061-C Pipe Mounting house brackets as specified.

Write for details today!

61 years **Porcelain Products, Inc.** PP INC.
FINDLAY, OHIO

ELECTRICAL BOOKS

SERVOMECHANISM PRACTICE, *by William R. Ahrendt, 349 pages, 6x9, McGraw-Hill Book Co., $7.*

Purpose of the book is to explain in detail the practical aspects of servomechanisms, to describe the many ways in which the essential function of servomechanisms components can be accomplished, to discuss the problems associated with the operation of servos and their components, and to outline practical design and manufacturing techniques to obtain optimum performance. Description and design data on all the important servomechanisms components. Problems and questions accompany each chapter.

TABLES OF INTEGRAL TRANSFORMS, *Vol. 2, Bateman Project Staff, editor A. Erdélyi, 451 pages, 6x9, McGraw-Hill Book Co., $8.*

Second of two volumes of tables of integrals involving higher transcendental functions, designed for the use of mathematicians, physicists and engineers. The two volumes contain tables of all integral transforms frequently used in pure and applied mathematics and in engineering. This is the first work in which the collection of known integrals involving higher transcendental functions is undertaken on a large scale.

MAGNETIC CONTROL OF INDUSTRIAL MOTORS, *by Gerhart W. Heumann, 714 pages, 6x9, John Wiley & Sons Inc., $9.50.*

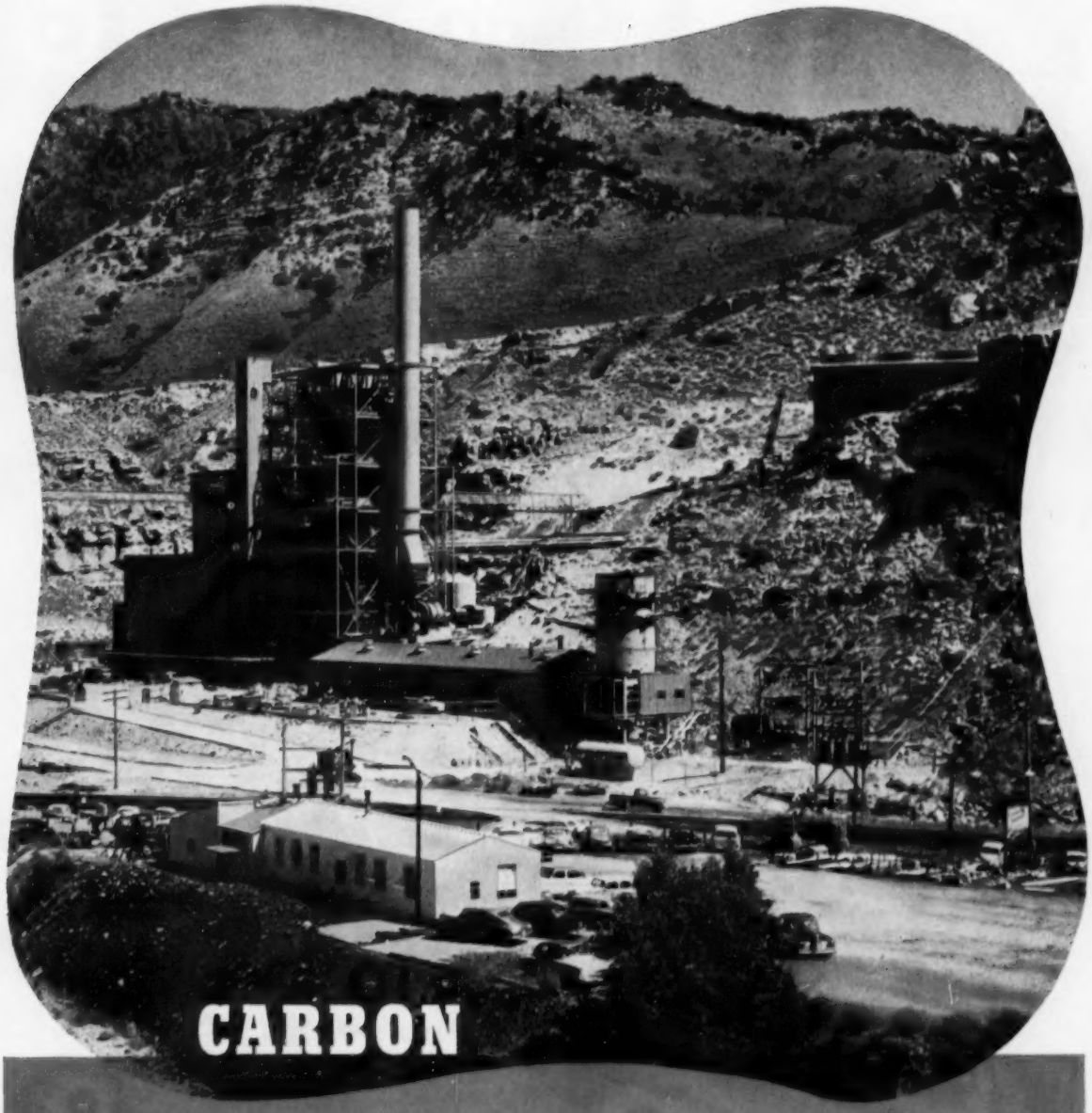
The many changes that have taken place in the design of control components since the first edition of this book are reflected in the new second edition, which has been brought completely up to date in line with recent advances in the electrical art. It includes much new material on adjustable voltage and regulating systems, particularly with regard to rotating and magnetic amplifiers. Obsolete controller designs have been entirely eliminated. Considerable stress has been placed on explaining the rules of the National Electrical Code that apply to motor controllers. Enables quick and accurate selection of the proper type of controller for a given application.

HOT STICKS, *by O. G. Anderson, D. C. Hubbard and H. A. Houston, 162 pages, A. B. Chance Co., $2.50.*

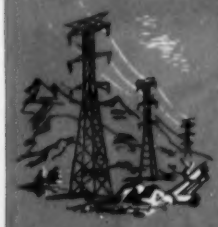
A descriptive manual for high-voltage line maintenance, this book contains sections on care of hot line tools, training hot stick crews, operation of principal hot line tools and 21 basic hot line tool jobs with step-by-step procedure. They include insulator, crossarm and pole changes on straight line, dead-end, running corner and suspension construction. The jobs are illustrated so that steps can be followed pictorially; voltage ratings are from 5 kv up to 287 kv.

ELECTRIC CURRENT ABROAD, *U. S. Department of Commerce, 37 pages, 6x9, 20c.*

A revision of World Electrical Current Characteristics published in 1948, data in this edition incorporate changes reported by the U. S. Foreign Service and foreign government publications since the first edition.



. . . Mine Mouth Power Plant



The completion of the 66,000 kilowatt Carbon Steam Plant at Castle Gate adds another important facility to the expanding system of Utah Power & Light Company.

The Carbon plant is appropriately named. Surrounded by commercial coal deposits, it has been designed to utilize this abundant fuel supply in an economical and efficient operation.

In a program that is supplying "more power to more people," UP&L placed responsibility for the Carbon Steam Plant with Bechtel—design through construction. It is one of four consecutive contracts by Bechtel for this utility.

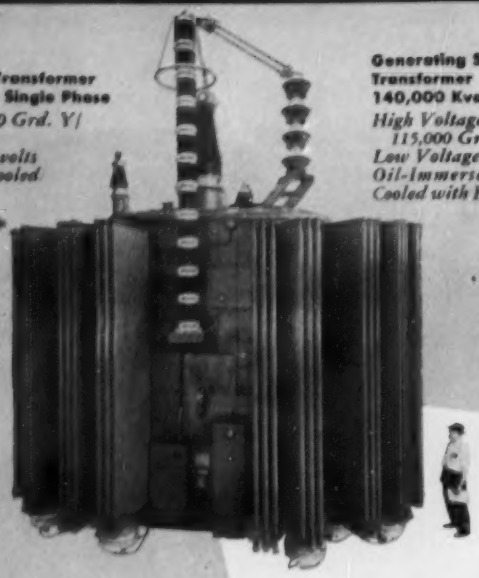
BUILDERS FOR INDUSTRY

BECHTEL

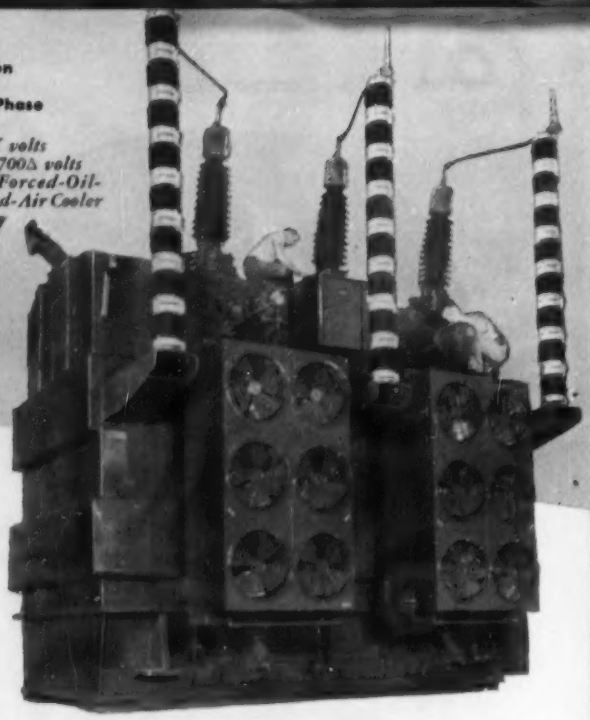
BECHTEL CORPORATION

Los Angeles • **SAN FRANCISCO** • *New York*

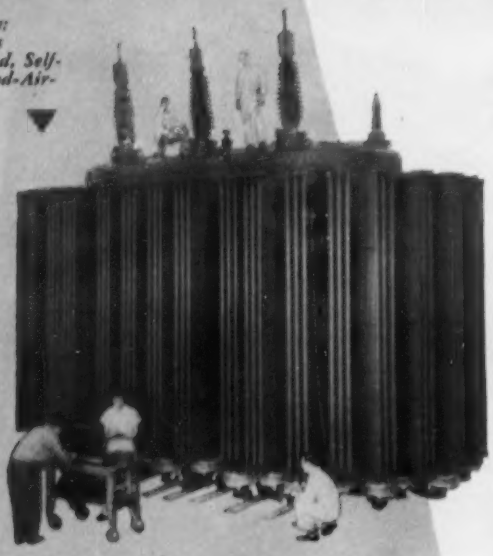
Generating Station Transformer
56,000/70,000 Kva, Single Phase
High Voltage: 161,000 Grd. Y/93,000 volts
Low Voltage: 19,000 volts
Oil-Immersed, Self-Cooled Forced-Air-Cooled



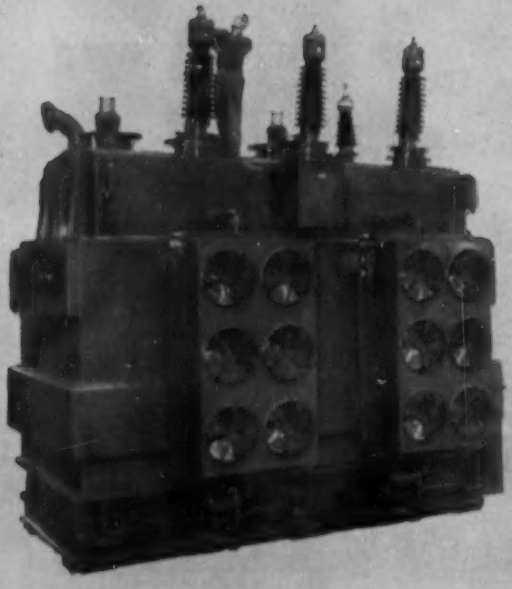
Generating Station Transformer
140,000 Kva, 3 Phase
High Voltage: 115,000 Grd. Y volts
Low Voltage: 14,700Δ volts
Oil-Immersed, Forced-Oil-Cooled with Forced-Air Cooler



Generating Station Transformer
68,000/90,666 Kva, 3 Phase
High Voltage: 132,000 Grd. Y/76,200 volts
Low Voltage: 13,200Δ volts
Oil-Immersed, Self-Cooled/Forced-Air-Cooled

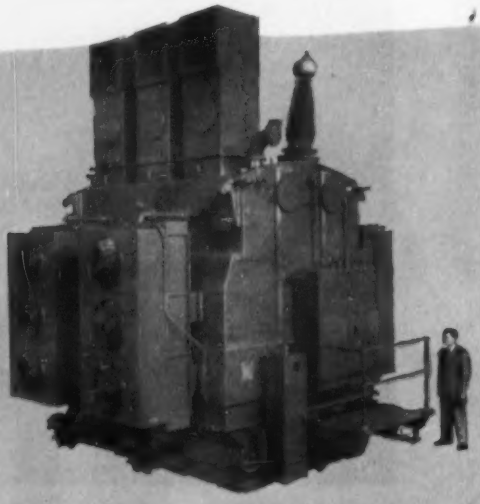


REPRESENTATIVE Power Transformers MANUFACTURED BY PENNSYLVANIA IN 1954

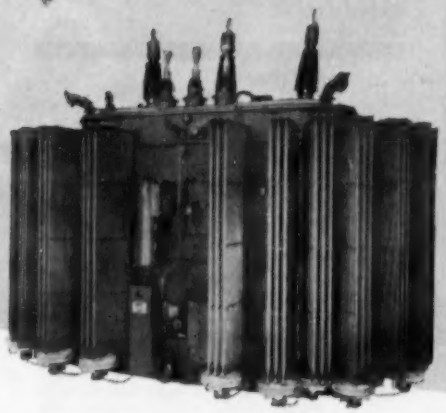


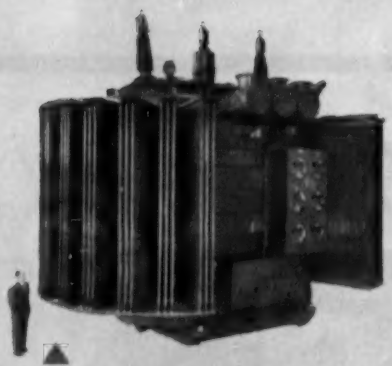
Generating Station Transformer
175,000 Kva, 3 Phase
High Voltage: 115,500 Grd. Y volts
Low Voltage: 17,500Δ volts
Oil-Immersed, Forced-Oil-Cooled with Forced-Air Cooler

Generating Station Transformer
120,000 Kva, 3 Phase
High Voltage: 145,000 Grd. Y volts
Low Voltage: 19,800Δ volts
Oil-Immersed, Forced-Oil-Cooled with Forced-Air Cooler



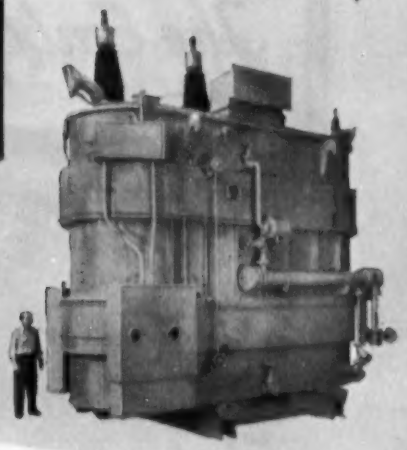
Generating Station Transformer
36,000/70,000 Kva, 3 Phase
High Voltage: 132,000Y volts
Low Voltage: 15,000Δ volts
Oil-Immersed, Self-Cooled/Forced-Air-Cooled





Substation Transformer
45,000/60,000 Kva, 3 Phase
High Voltage: 125,400Δ volts
Low Voltage: 13,800Y volts
Oil-Immersed, Self-Cooled/Forced-Oil-Cooled with provision for future OA/FOA/FOA rating of 75,000 Kva

Generating Station Transformer
48,000 Kva, 3 Phase
High Voltage: 115,000 Grd. Y volts
Low Voltage: 13,200Δ volts
Oil-Immersed, Forced-Oil-Cooled with Forced-Water Cooler

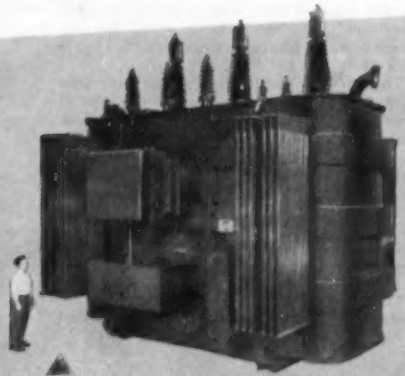


Here are some of the single phase and three phase power transformers manufactured by Pennsylvania in 1954. They are representative of the large core-form and contour-design (shell-form) transformers that are preferred by leading utilities and industrials. Some of these units are for generating station service. Others are typical power transmission transformers. Every type of cooling method is represented in these transformers. Typical accessories include load tap changing mechanisms, lightning arresters, and potential devices. In short, these transformers represent Pennsylvania's complete coverage for the large power transformer needs of this country.

Expanded plant facilities also made it possible for Pennsylvania to offer transformers in ratings up through 350,000 Kva and in voltages through 330 Kv. This includes load tap changing transformers up to 150,000 Kva.

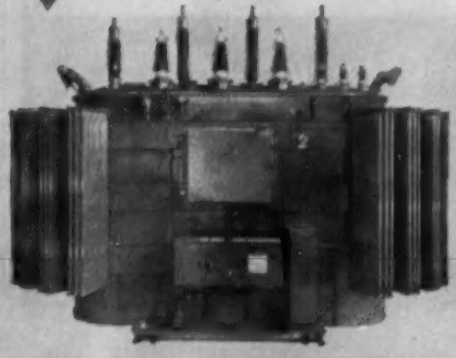
It is significant, too, that 1954 was a record-breaking production year at Pennsylvania, indicating in a concrete manner the trust placed in Pennsylvania Transformer Company, its people and its products.

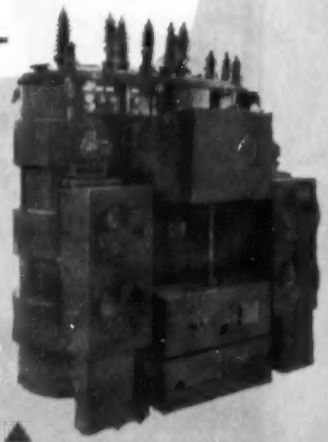
PENNSYLVANIA TRANSFORMER COMPANY . CANONSBURG, PA.
A McGraw Electric Company Division



Substation Transformer
15,000 Kva, 3 Phase, with load tap changing equipment
High Voltage: 154,000Y volts
Low Voltage: 69,000 Grd. Y volts with plus and minus 10% regulation in 32—5/8% steps
Tertiary Voltage: 12,470Δ volts
Special design for shipping in one-piece tank

Substation Transformer
25,000 Kva, 3 Phase, with load tap changer
High Voltage: 138,000Y volts
Low Voltage: 69,000 Grd. Y volts with plus and minus 10% regulation in 32—5/8% steps
Tertiary Voltage: 12,400Δ volts
Oil-Immersed, Self-Cooled





Substation Transformer
30,000 Kva, 3 Phase, with load tap changing equipment
High Voltage: 66,000Y volts, with plus and minus 5% regulation in 32—5/8% steps
Low Voltage: 33,000Y volts
Tertiary Voltage: 13,800Δ volts
Oil-Immersed, Forced-Oil-Cooled with Forced-Air Cooler

The Emblem of Safety

SAFETY
LIVE LINE
TOOLS

are designed for work at safe distances from energized lines.

Write for Catalog # 8

SAFETY LIVE LINE TOOL CO.

973 - 86TH AVE. • OAKLAND 21, CALIF.

Est. 1926 by Chester C. Coon

LETTERS TO THE EDITOR

Elect Electronics

To the Editor:

I have read with interest your article on the shortage of electrical engineers appearing in the October 1954 issue of ELECTRICAL WEST. Being an engineering student having recently elected the electronics option, I feel that my reasons for doing so should be of interest.

The fact of the matter is that Western colleges are supplying engineers but engineering students are not electing the power option in as large a number as necessary to meet the need. To the electrical engineering student who has been primed with the unlimited possibilities of electronics, the thought of being scooped up by a power syndicate and being relegated to the task of dispensing power from locality to locality day after day is a pretty dull prospective future. Even the thought of system design, probably the most creative phase of power work, does not convey the variety of interest that the up-and-coming engineer seeks. Monotony is the one thing that stifles the ambitious student.

What has to be done then? To be sure, the student must be informed of the true nature of the power option. Is this the job of the faculty advisor? No! Most students have made up their minds as to which field of engineering they wish to enter before they ever talk to their faculty advisors. The electrical power companies that want and need new engineers must take upon themselves the task of enlivening the prospect of working for a utility company so that it can meet the stiff competition that electronics and other newly developed fields are giving to it in taking away the engineers that it needs.

The student of today has grown up with the power lines and power poles setting outside his house. Those very same power poles and power lines have probably set outside his house as long as he can remember. They are as static and as commonplace as the dirt that holds them up. To expect an up-and-coming student with visions and hopes and dreams and expectations to throttle himself with such a prospect when other fields are available in which he can let his imagination seek expression is highly unlikely.

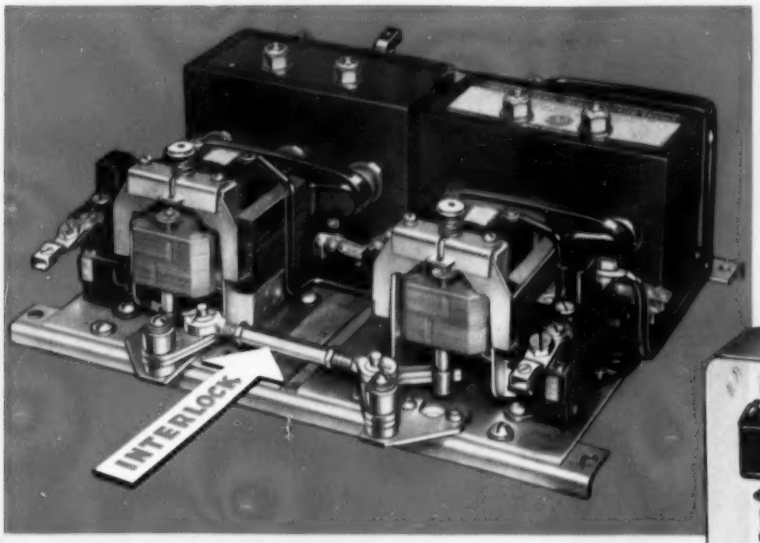
The power companies must start and must start now to modernize the concept of power engineering in the student's mind. The thought of power engineering must be brought up to date so that it can compete with the fast-moving fields of electronics. Mere lauding of benefits, pensions and vacations is insufficient to sway the young college student to the field, simply because youth is not afraid of old age and it is not afraid of work.

GEORGE SCHULKE
Junior, Electrical Engineering Department
Montana State College
Bozeman, Mont.

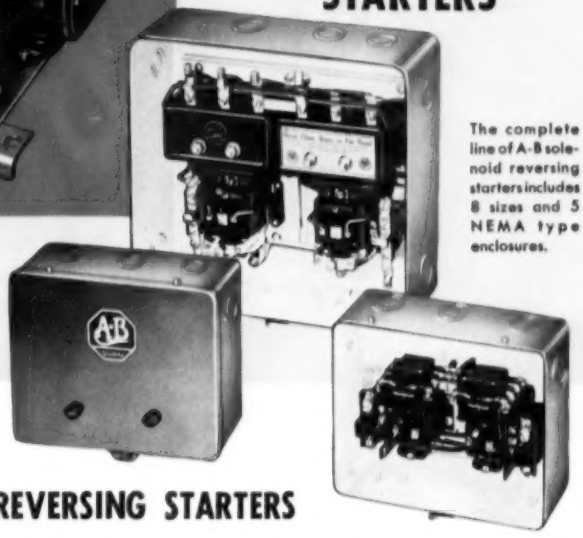
Editor's Note: We are pleased to note the great amount of interest engendered by our two articles on the engineering manpower problem. Mr. Schulke's letter deserves serious thought. ELECTRICAL WEST will soon publish another article on engineer shortage.

BULLETIN 705 REVERSING

ACROSS-THE-LINE STARTERS



Allen-Bradley reversing starters have two solenoid contactors—FORWARD and REVERSE—which are mechanically, as well as electrically, interlocked to provide maximum safety for motor and machine.



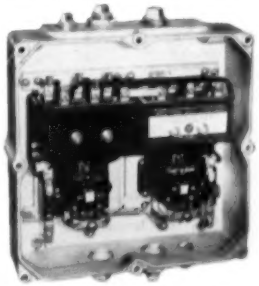
The complete line of A-B solenoid reversing starters includes 8 sizes and 5 NEMA type enclosures.

TROUBLE FREE REVERSING STARTERS

..... up to 300 HP, 220 V; 600 HP, 440-550V.

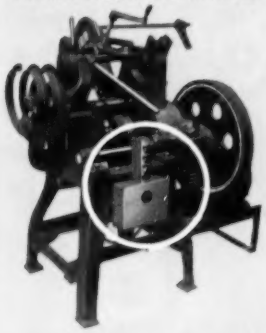
For squirrel-cage or slip-ring motors that must be reversed in their operation, the most dependable control is the Bulletin 705 reversing starter. The two Allen-Bradley solenoid switches . . . with their double break, silver alloy contacts . . . are maintenance free. Their rugged construction makes them especially suitable for plugging operations. The contacts will not weld or flash over, and they require no cleaning, filing, or dressing.

Bulletin 706 combination reversing starters are equipped with manual disconnect switches, with or without fuses. Bulletin 707 combination reversing starters have circuit breakers. Allen-Bradley reversing starters are available with or without overload relays. Listed as standard in enclosures for general purpose, watertight, weatherproof, and hazardous dust and fume locations. Write for A-B Handy Catalog, today.

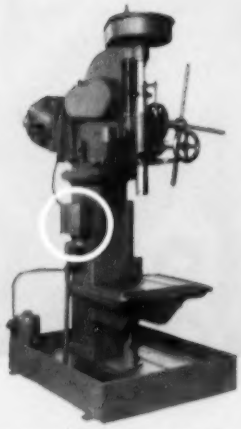


Bulletin 705 reversing starter in NEMA Type 4 waterproof enclosure.

TYPICAL APPLICATIONS



Excelsior Circular Bending Machine with A-B reversing starter and 3-button control.



Baker Heavy Duty Drilling Machine with A-B reversing starter in NEMA 1 enclosure.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Limited—Galt, Ont.

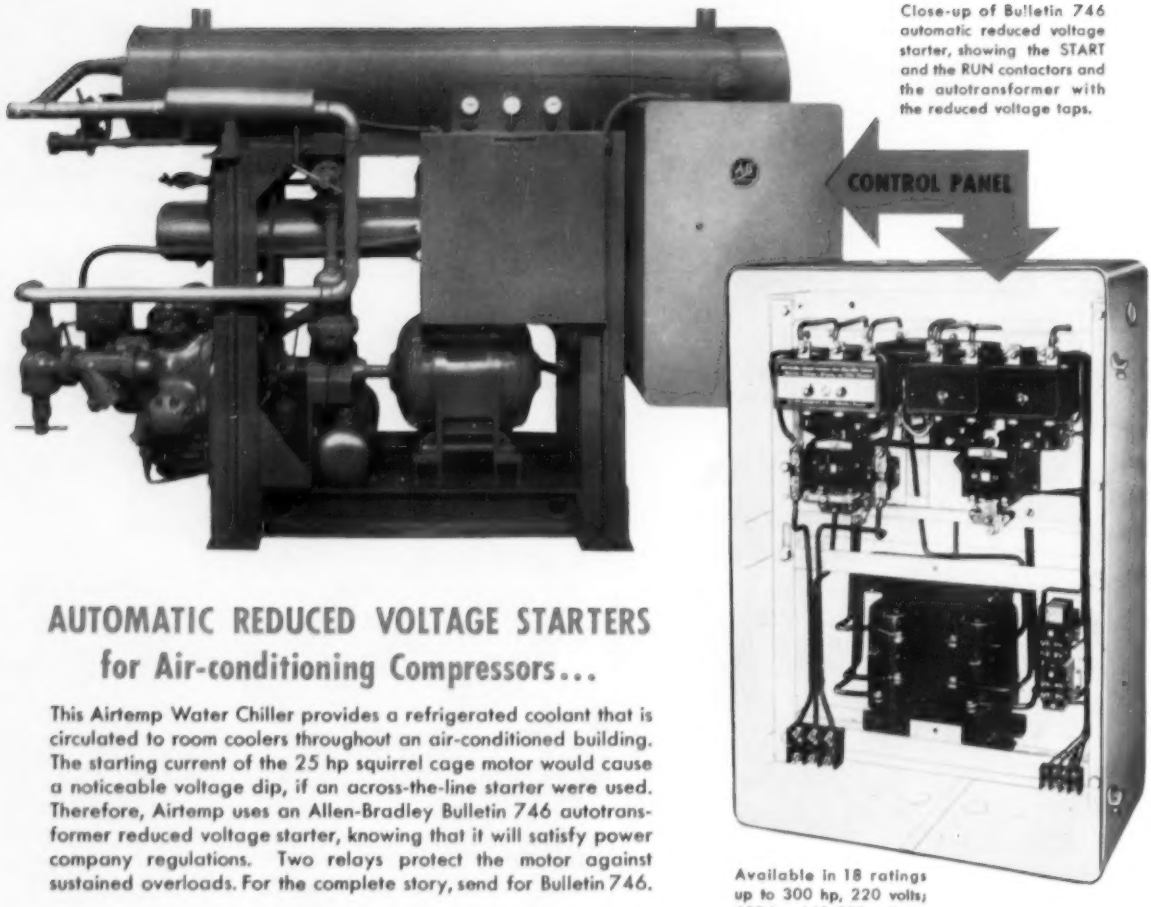
3-55-M

A-B Quality

ALLEN-BRADLEY

BULLETIN 705 REVERSING SWITCHES

QUALITY



Close-up of Bulletin 746 automatic reduced voltage starter, showing the START and the RUN contactors and the autotransformer with the reduced voltage taps.

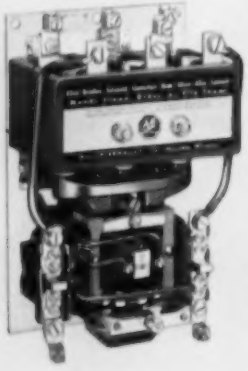
Available in 18 ratings up to 300 hp, 220 volts; 600 hp, 440-550 volts.

AUTOMATIC REDUCED VOLTAGE STARTERS for Air-conditioning Compressors...

This Airtemp Water Chiller provides a refrigerated coolant that is circulated to room coolers throughout an air-conditioned building. The starting current of the 25 hp squirrel cage motor would cause a noticeable voltage dip, if an across-the-line starter were used. Therefore, Airtemp uses an Allen-Bradley Bulletin 746 autotransformer reduced voltage starter, knowing that it will satisfy power company regulations. Two relays protect the motor against sustained overloads. For the complete story, send for Bulletin 746.

QUALITY COMPONENTS OF ALLEN-BRADLEY BULLETIN 746 AUTOMATIC AUTOTRANSFORMER STARTERS

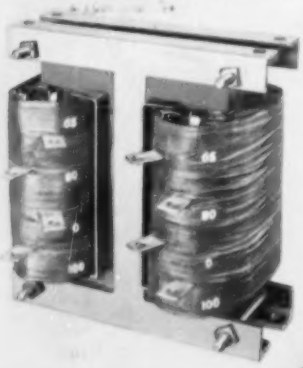
SOLENOID STARTER



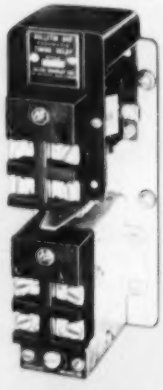
The basic unit of the Bulletin 746 reduced voltage starter is the Bulletin 709 solenoid switch with double break, silver alloy contacts that are maintenance free. They are good for millions of trouble free "starts."

Right — Autotransformer with 50, 65, and 80% taps.

TAPPED AUTOTRANSFORMER



TIMING RELAY



Right — Bulletin 849 pneumatic adjustable timer which controls the time interval between closing of the "start" contactor and closing of the "run" contactor. It automatically disconnects the autotransformer and closes the running contactor for full voltage on the squirrel-cage motor.

3-55-M

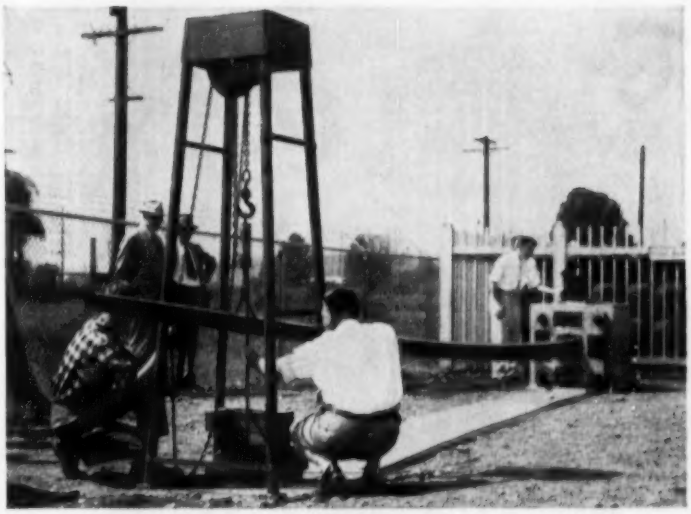
Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Limited
Galt, Ont.

A-B Quality

ALLEN-BRADLEY QUALITY

CARCO

Steel Light Poles



SHIMMING ELIMINATED

Erection and plumbing of standard Carco anchor base and transformer base poles are combined in one easy operation. This is done by placing an extra nut on each anchor bolt before setting the pole. The simple adjustment of these nuts under pole base brings it quickly to plumb. Shimming is completely eliminated.

Write our Light Pole Division for copy of new catalog on Carco steel light poles.

EXACTING TESTS PROVE STRENGTH OF CARCO STEEL LIGHT POLES

Pictured above are several city engineers witnessing one of the tests continually being made to prove beyond a question of doubt the strength of Carco steel light poles. Hung from the A frame in foreground is a dynamometer, while an electrical strain gauge rests on concrete block to which pole base is attached. The purposes of these tests are two-fold: (1) to determine strength of base in relation to strength of pole and (2) to determine loads that pole can carry in terms of bracket, road signs, signals, decorations and wires, particularly when iced or subjected to strong winds. In every test ever made Carco steel light poles have exceeded the most exacting specifications. Designed to meet the I. E. S. street lighting code, Carco poles offer buyers of lighting equipment many exclusive advantages that make for added strength and permanence, easy erection and maintenance. Carco standard poles are available in either anchor base or transformer base types with mounting heights from 21′ 6″ to 31′ 6″. Underbraced brackets from 4 to 8 feet are available as are overbraced brackets from 10 to 15 feet. Special poles and brackets quoted on request. It will pay you to investigate Carco steel light poles. Your inquiry will be promptly handled.

PACIFIC CAR AND FOUNDRY COMPANY

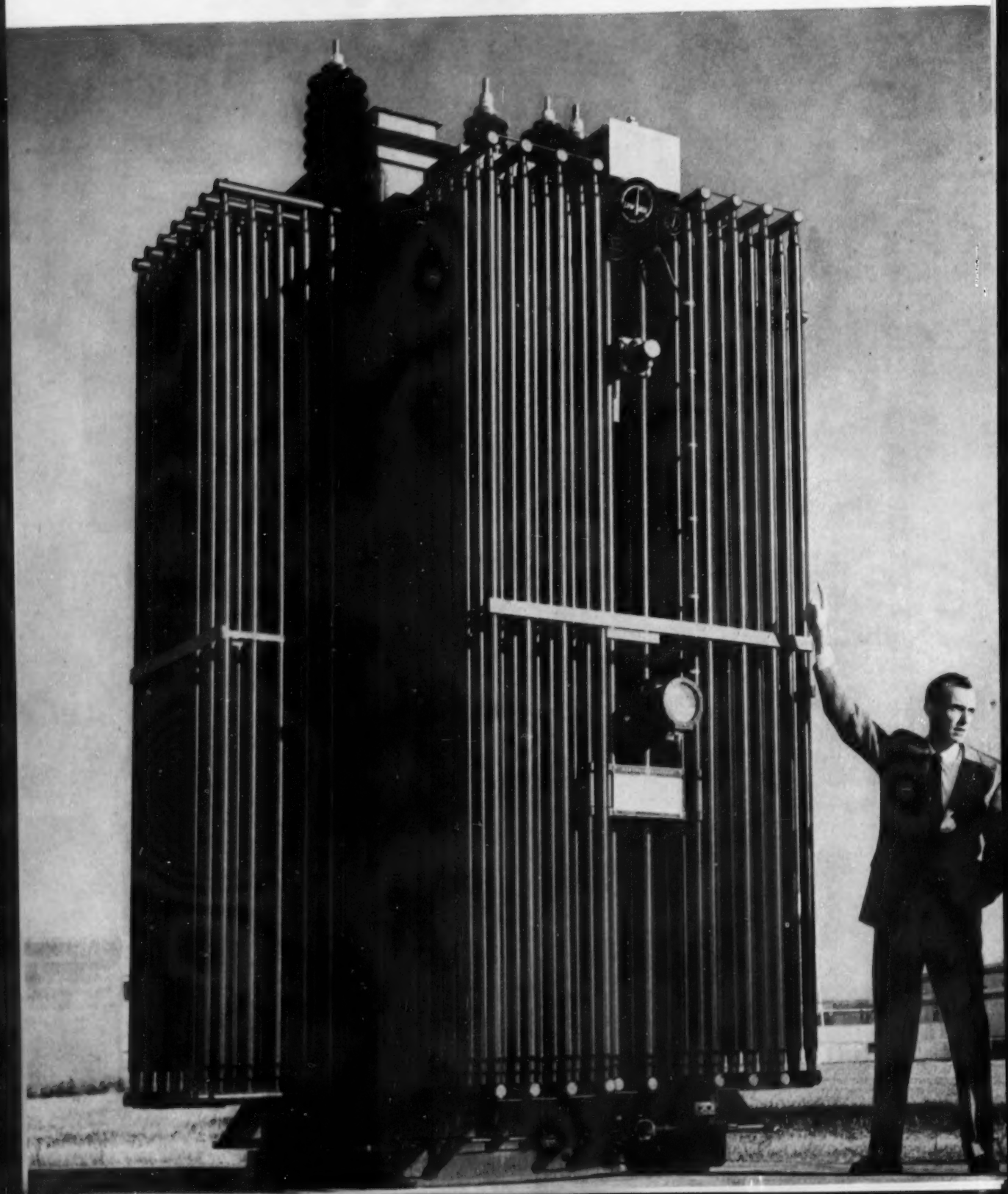
RENTON, WASHINGTON

STEEL LIGHT POLES, RAILROAD CARS, TRACTOR EQUIPMENT: Winches, Logging Arches, Log Carts, Dozers
STRUCTURAL STEEL FABRICATION AND ERECTION, STEEL CASTINGS, FORGING

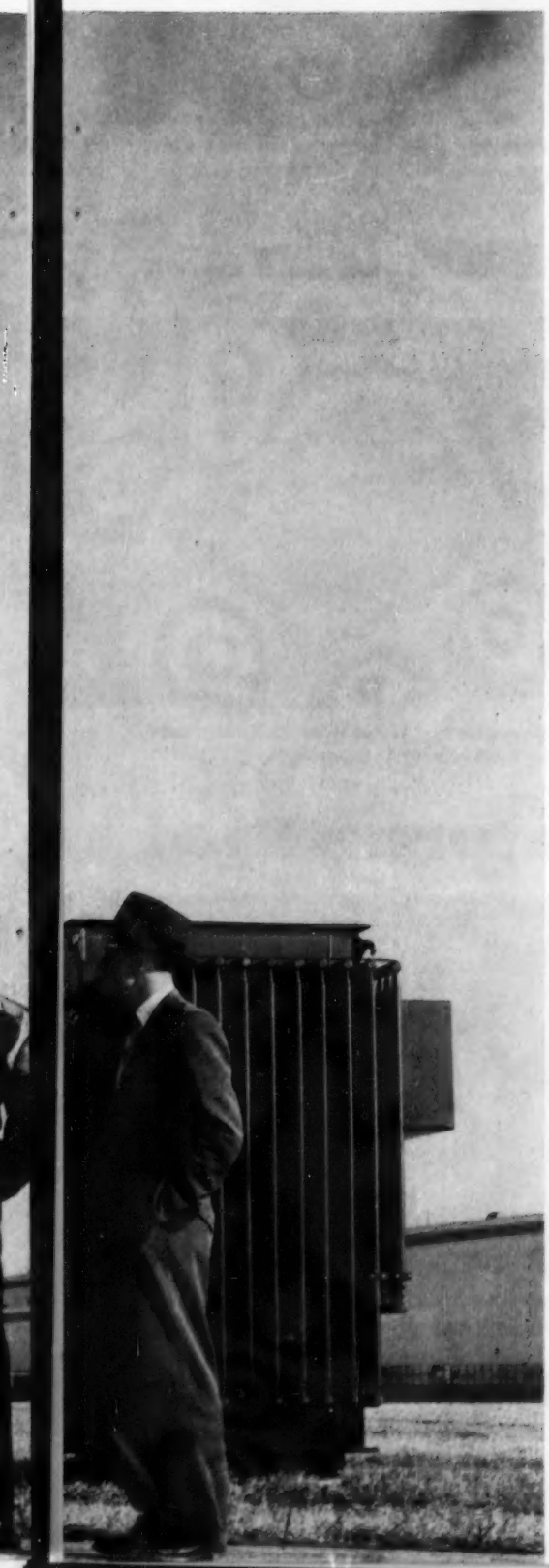
CARCO®

ANNOUNCING

the new 1955 G-E



RM power transformer



A COMPLETELY RE-DESIGNED TRANSFORMER... WITH INSTRUMENTS GROUPED IN ONE EASY-TO-READ CONTROL CENTER... PLUS MANY OTHER NEW FEATURES YOU'VE ASKED FOR

Now a complete re-design of General Electric's entire RM (Repetitive Manufacture) line of power transformers brings you many new features that mean easier installation, less maintenance and longer life.

In the new 1955 line of RM transformers, for example, all instruments are grouped in one convenient location. Called the "control center," this unique arrangement improves visibility and simplifies maintenance. Recessed behind the cooling tubes, all accessories including the tap changer operating handle are protected against accidental damage. All are safely accessible even with the transformer energized.

Many new money-saving features of G.E.'s 1955 RM transformer line resulted from product planning meetings with more than 75 electric utilities. Such things as American Standard bushings, weather-tight conduit, extra jacking space, and prefitted arrester-to-bushing connectors were first suggested by the men who actually use and install transformers.

The 1955 line has also been re-designed to give you a transformer of even greater reliability. Use of Formex* wire, for example, results in a smaller, lighter, yet more dependable unit. All single-phase transformers feature improved performance because of Spirakore* construction which gives you the full benefit of the directional properties of grain-oriented steel.

Your acceptance of power transformer standardization has made this new transformer possible. Available in ratings 501 to 5000 kva single phase and 501 to 10,000 kva three phase, 69 kv and below, 1955 RM transformers are being built at Rome, Georgia, on the nation's only real "mass production" line for power transformers. To see how these new transformers can benefit you, just get in touch with your nearest G-E Apparatus Sales Office or write for Bulletin GED-2505. Address your request to Section 416-1, General Electric Company, Schenectady 5, New York.

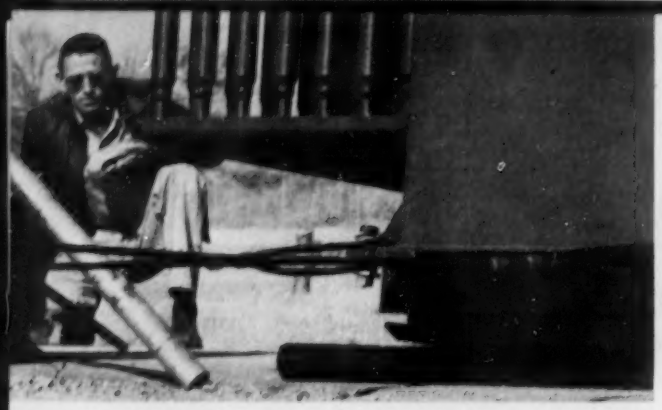
*Reg. trademark of General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC

To See More of the Advantages of G.E.'s New RM Transformer for '55

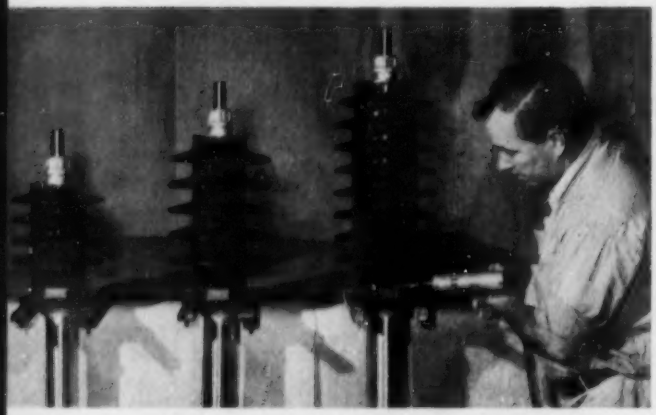
TURN PAGE→



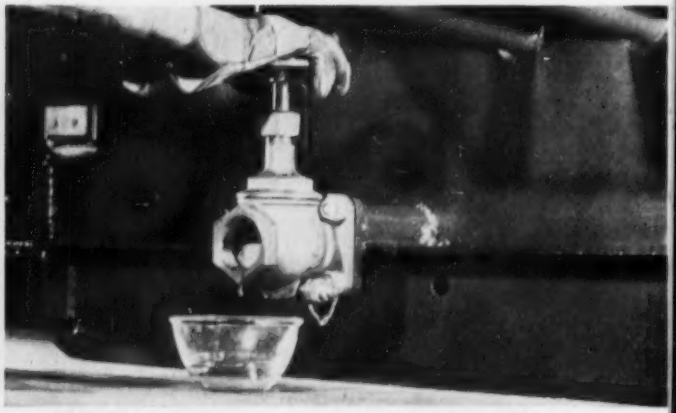
SKI-TIP BASE on '55 model mounts rollers smoothly for faster, easier installation.

EXTRA JACKING SPACE saves time, permits use of most jacks available in the field.

G.E.'s new 1955 RM trans-



AMERICAN STANDARD BUSHINGS on all '55 units will eventually help reduce your bushing inventories.



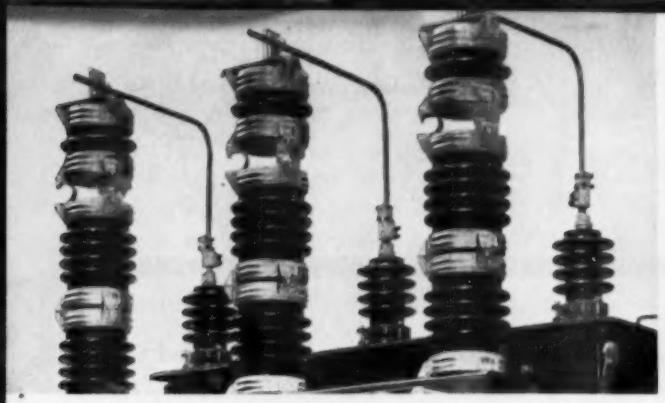
FULL DRAIN allows you to filter **all** the oil. Result: more effective filtrations, more accurate sampling.

has many features that

DOMED COVER sheds water to help prevent rusting on top of the transformer.

WEATHER-TIGHT CONDUIT and fittings keep out water, yet are quickly assembled without cutting threads.

and give longer service life



PRE-FITTED CONNECTORS between arresters and bushings save time and expense of fabricating in the field.

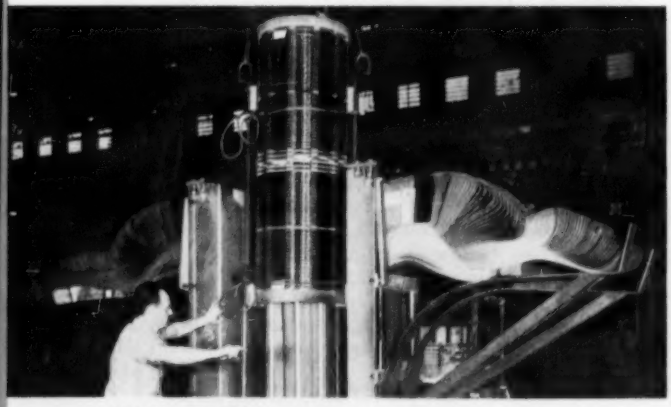
FORMEX* WIRE (right) more rugged than paper and tape also reduces transformer size and weight.

former is easy to install

RE-USABLE NITRILE GASKETS, applied throughout 1955 line, require no cement, are easily used over and over again.

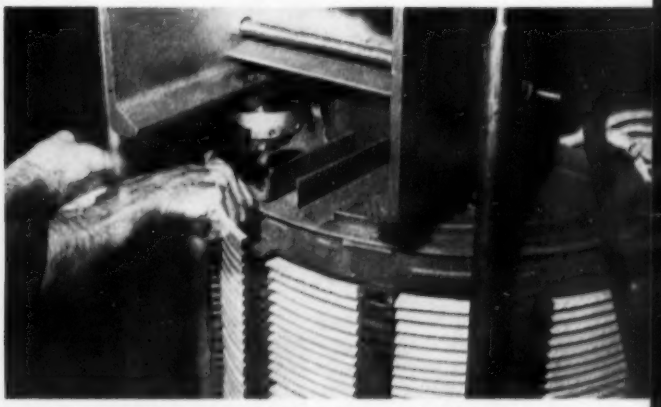
SUPER MELAGLYP FINISH—flow-painted on—gives the 1955 G-E transformer superior rust protection.

reduce maintenance costs



SPIRAKORE* DESIGN gives improved performance to all single-phase transformers in the 1955 line.

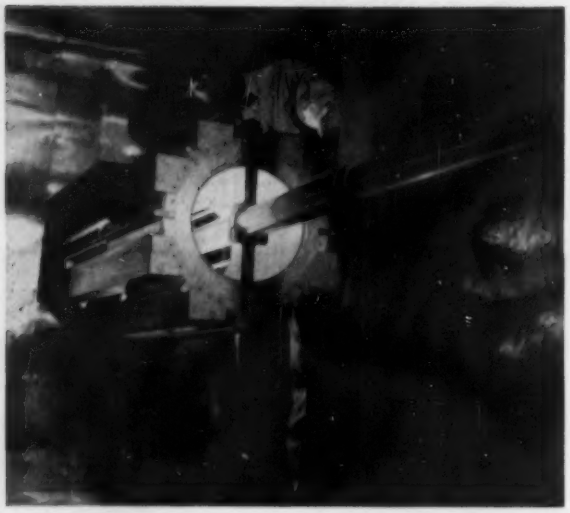
*Reg. trademark of General Electric Company



ADJUSTABLE COIL CLAMPS tighten windings after drying, keep coil stack rigid to resist mechanical stresses.

GENERAL ELECTRIC

PRODUCT NEWS



(1) ATOMIC REACTOR—Available on the market for industrial and educational use (subject to the Atomic Energy Act of 1954) is this low-power atomic research reactor. It was developed by G-E's General Engineering Laboratory from a prototype built by the Knolls Atomic Laboratory for the AEC. One important application is detection of minute impurities in nuclear fuels for large reactors that may be built for production of electric power. In the reactor core, shown here, neutrons are hurled against test materials at speeds of about a mile per second. The neutrons are "slowed" to this speed by about 12,000 lb of graphite that surround the core when the reactor is in operation. Materials to be tested are guided into the core by the cylinder-shaped tube. Details from General Electric Co., Schenectady 5, N.Y.

Addition to Connector Line

(2) Gedney Electric Co., RKO Bldg., Radio City, New York 20, N. Y.

A new connector for Sealtite conduit is designed to give safe and dependable protection for wiring installations in this type of flexible raceway and is built for lifetime service, its manufacturer states. It consists of a locknut and main fitting, brass grounding bushing, molded neoprene gasket and hex gland nut. Locknut, main fitting and gland nut are made of malleable iron and hot dip galvanized. The fitting is available in standard sizes from ½ to 2 in.

For More Data Fill in Coupon on Page 66

Fractional Horsepower Motors Redesigned

(3) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

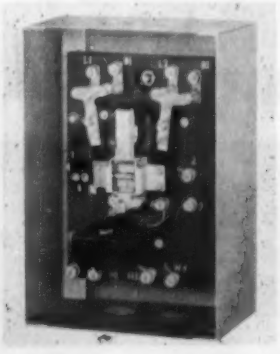
A completely redesigned line of fractional horsepower motors in the NEMA 48-frame size ranges in ratings from 1/6 through 1/3 hp. Developed to meet the need for a smaller size, lightweight motor, the new units are ¾ in. lower and 1 in. shorter than NEMA 56-frame motors having the same ratings, the manufacturer reports. The distance from base to center line is 3 in. as compared to 3½ in. on the NEMA 56-frame.

These motors incorporate a simplified straight-through ventilation system with vent holes limited to the bracket areas. On single-phase motors terminal board design permits change of voltage or motor reversal by interchanging quick-disconnect plugs in the motor conduit box. This simplifies the wiring of the motor to the power source and increases net usable area for wiring purposes.

New sleeve bearing construction provides lubrication and nylon thrust washers to permit a variety of mounting positions. The motor will be available in both resilient and rigid mountings.

Time Delay Relay

(4) Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.



With this new time delay relay any delay from ½ to 6 seconds may be obtained for all standard a-c voltages. The relay is available also for other frequencies and for d-c.

Feature of the device, according to its manufacturer, is its capacity for handling motor loads directly. It provides both a time delay relay and a contactor in one unit.

Where the motor has a drum switch control, each time the drum switch is operated to the motor stop position, the time delay relay closes, energizing the brake winding. The relay automatically disconnects the brake winding ½ to 6 seconds later, according to setting. A simple locking-type rheostat screwdriver adjustment is provided for selection of the timing period. Similar connections are made when an across-the-line starter controls the motor.

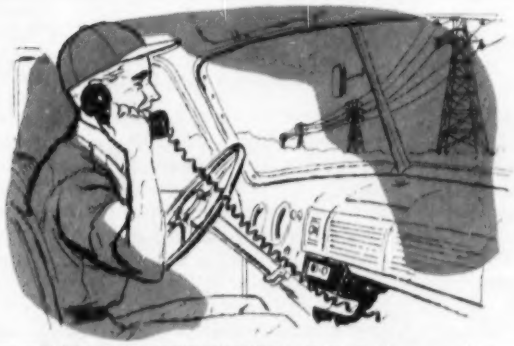
This relay may be used also as a single pulse time delay. Each momentary closing of the push button causes the relay to close, connecting the line to the uncontrolled equipment. The relay automatically disconnects the circuit in the set interval. For repeated cycling, with external contact closed, the relay repeatedly closes and drops out at intervals of ½ to 6 seconds.

Publication 555 describes this time delay relay in detail.

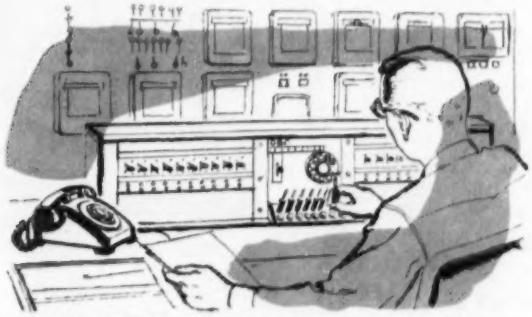
6 ways to save money in communications

If you want to save money and, at the same time, increase efficiency, let the Bell System furnish your communications. To get the facts, Bell System engineers will gladly make a joint review with your people. Ask your Bell telephone representative for more information.

BELL SYSTEM GIVES YOU COMMUNICATIONS AT LOW COST



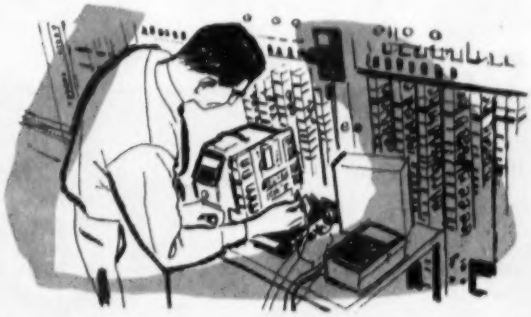
TAILORED COMMUNICATIONS—Bell System engineers fit your communications to your needs. You get precisely what you require. No more, no less.



FLEXIBLE COMMUNICATIONS—Designed to meet your exact requirements, Bell System communications may be expanded or rearranged to match the changing needs of your business.

NEWEST EQUIPMENT—The latest developments in communications equipment are available to keep your service at peak efficiency without investment of your capital.

ROUNDED EXPERIENCE—You benefit from years of Bell System experience with specialists in all phases of communications.



RELIABLE MAINTENANCE—You are relieved of repair and replacement worries. And Bell System preventive maintenance insures that your communications stay reliable.

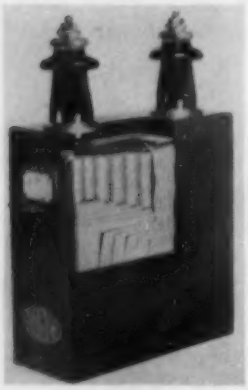
YOUR MONEY is available to invest in revenue-producing projects, not tied up in communications equipment. A fixed monthly charge covers your exact needs.

BELL TELEPHONE SYSTEM

TELEPHONE MOBILE RADIO TELETYPEWRITER INTERCOMMUNICATION AND PAGING SYSTEMS TELEMETERING AND REMOTE CONTROL

Power Capacitors

(5) Sangamo Electric Co., Springfield, Ill.



With introduction of Diaclor power capacitors, this manufacturer has entered the power capacitor field. The units will be available initially in two standard ratings: 2,400 v, 25 kvar; 7,200 v, 25 kvar.

These capacitors are supplied in all-welded, heavy-gage cases of stainless steel or aluminum-metallized mild steel. A five-step corrosion-resistant treatment gives the mild steel case enduring protection against corrosion and abrasion.

Diaclor, a nonflammable stabilized liquid dielectric, enables operation in ambient temperatures ranging from minus 40 C to plus 46 C, the manufacturer states. The Diaclor completely fills case and bushings. An internal reservoir maintains full insulation to case when the unit is end-mounted, even in coldest weather, it is stated.

Illustration has cutaway showing internal construction and multilayer Kraft paper insulation. Details in bulletin 1120.

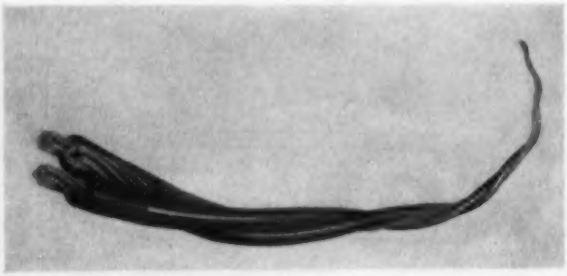
(6) FLUORESCENT STREET LIGHT — Claimed to give safety and visual comfort at the street level for pedestrians and motorists, this new fixture may be set horizontally or tilted to any angle between 20° and 30° by means of an adjustable bracket. This broad light pattern is designed to eliminate hazardous blackout areas along parkways and city streets. Made by Westinghouse Lighting Division, the fixture has a clear, weatherprotecting plastic cover. Its upper hood, about 6 ft long, is made of a special laminated fiber glass, which has permanent color. It is corrosion resistant and is sealed against insects, dirt and water. Four 72-in. F lamps are used in each fixture. The lamps are designed to avoid substantial drop off of illumination through a range between 30° below zero to 80° above. Details may be secured from the manufacturer at Edgewater Park, Cleveland, Ohio.

Vinyl Plastic Strip

(7) BullDog Electric Products Co., Detroit 32, Mich.

Called Electrostrip, a new baseboard assembly will be available nationally in late March. This vinyl plastic strip is rigid but can be hand molded to go around corners and posts, its manufacturer states, and is easily and quickly attached along baseboards or on walls. Specially designed and fused receptable plugs can then be attached at any point along the strip. A tiny lever is raised to release the plug for reuse at another location.

The strip is UL listed, comes in 250-ft rolls, is ivory in color. It can be wired to existing outlets or installed in new construction.



Service Drop Cable

(8) Rome Cable Corp., Rome, N. Y.

A new type of service drop cable, called TreePlex, was designed to withstand the abrasive wear and cutting action of tree limbs. A tight, thin (.005 in.) sheath of nylon has been added to the tough polyethylene insulation covering each power conductor, according to the manufacturer, and this compound has been heat and light stabilized for extra long weather resistance.

The manufacturer states that tests show an increased wear resistance of more than 50 times over standard service drops of this type and that the cable can be installed directly through heavy trees without tree trimming or guards. The nylon sheath is also said to provide a higher factor of safety against current overload; to resist heat deformation, flame and burning.

This neutral-supported service drop cable is available in duplex, triplex and quadrex types. It can be obtained with copper or aluminum power conductors spiraled around neutral messengers of copper, Copperweld, ACSR or aluminum. On special order it can be supplied with a polyethylene-covered weatherproof wire as the neutral conductor.

Fill in the Coupon on Page 66

ALL THE FEATURES *plus* ....

MATCHED ENCLOSURES!

SQUARE D's
NEW
DISTRIBUTION
SWITCH BOARDS

DESIGN LEADERSHIP FEATURES

Distinctive Styling provides an attractive, modern appearance matching the control center design.

Easier Installation because removable front and back plates expose generous wiring parts. Isolated horizontal wiring trough has drop-off openings, assuring safer, neater wiring.

Flexibility. Complete sections or branch units can be added or changed to meet specific job requirements.

Easier Inspection and Maintenance. Front, side and back plates are removable, thus providing easy and immediate access to specific areas.

SEPARATELY .... OR AS A TEAM THEY DO THE JOB BETTER!

Write for Bulletin SD-18. Address Square D Company

SQUARE D's **NEW**
PLUG-IN
CONTROL CENTERS

DESIGN LEADERSHIP FEATURES

Increased Safety because bus bars are fully enclosed, rigidly supported and have ample cross section...circuits isolated by individually enclosed plug-in units...disconnect handle designed for maximum operator protection.

Flexibility. Individual plug-in units or complete sections can easily be added, removed or exchanged. Push-buttons, pilot lights, and selector switches can readily be added to unit doors.

Installation Economy. All wiring channels are large and accessible from front without removing units...no "wire fishing."

Space economy, too. Up to six combination starters fit in a 20"x20"x 90" section. Plug-in unit heights are designed in space-saving increments of 3 inches.

Write for Bulletin 244. Address Square D Company, 4335 Valley Blvd., Los Angeles 32, Calif.

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Mathias KLEIN & Sons

Protective Device

(9) The Chase-Shawmut Co., Newburyport, Mass.

For underground cables in 480/277-v systems, as well as 208/120-v systems, a new Amp-trap, the CP-6, has been introduced to protect cable and associated equipment against faults of both high and low magnitude while permitting continuous operation at full normal rated ability.

According to the manufacturer, short-circuit tests on the 4/0 and 500 MCM CP-6 models, rated at 100,000 rms amp interrupting capacity, prove they can stop shorts as high as 200,000 amp at 535 v. The CP-6 is claimed to limit the fault current to about 10% of its maximum available value and to clear the fault completely in less than one-quarter cycle.

The device also prevents cable burn-up from relatively low ampere arcing fault currents. With the 4/0 and 500-MCM Amp-traps connected in series, the 4/0 will blow and the 500 MCM will not, isolating the fault to a particular tap or feeder.

Designed for use in circuits 600 v a-c and lower, the CP-6 is available with tubular, blade or rod terminals for a-c network.

Window Fan

(10) Kisco Co. Inc., 2400-40 De-Kalb St., St. Louis 4, Mo.

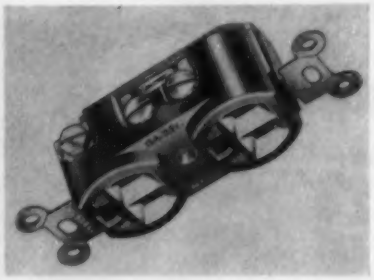
A new finger tip controlled reversible window fan is designed to eliminate need for taking the unit out of the rack; is switched from exhaust to intake by pushing a button. It has a choice of two speeds; is in a perforated metal cabinet; is powered by a heavy-duty motor; comes in a champagne-ivory baked enamel. Over-all dimensions are 24x24 with adjustable panels extending to 38 in. Capacity is 3,000-2,200 cfm, 185 w, 1,000-750 rpm.

MV Lamp

(11) Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

A new 250-w color-corrected mercury vapor lamp was designed principally for installations where lamps must be mounted at heights under 20 ft. Color correction results in a golden white light, it is explained.

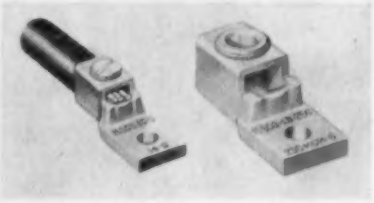
Designated the CC-H5, the lamp is for commercial and industrial installations where low mounting heights make higher wattage unsuitable and as a medium bright source for tapering off zones between brightly lit city streets and residential areas or open country, according to its manufacturer.



Convenience Outlet

(12) Harvey Hubbell Inc., Bridgeport, Conn.

A new three-wire grounding-type convenience outlet is designed for ground-exposed metal parts of portable electrical equipment. This No. 5252 unit is a duplex, flush-mounted receptacle; features large head binding screws for conventional wiring plus a hexagonal green screw to denote grounding wire. A break-off feature is provided for two circuit installations. It may be used with both metallic and nonmetallic wiring systems; comes in brown Bakelite and ivorine.



Solderless Lugs

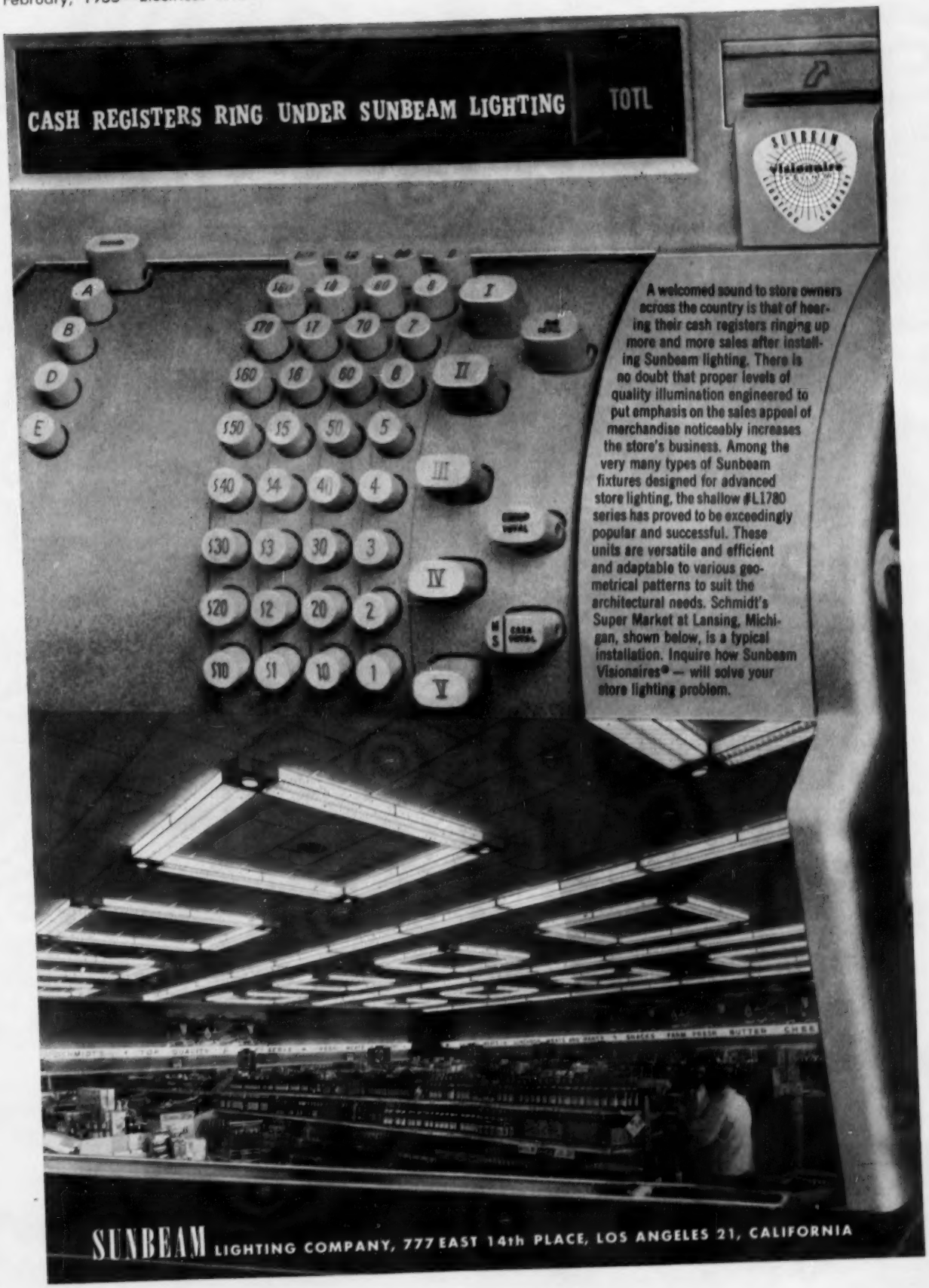
(13) Ilsco Corp., Mariemont, Cincinnati 27, Ohio

A line of LO solderless lugs is being produced with open barrel in 125-, 225-, 300- and 400-amp sizes. Advantages claimed are greater wire holding space and visual insertion of cable. The unit is made of extremely hard tempered copper tubing and tests show that twice the torque specified by UL may be applied, the manufacturer states.

Heat tests are said to show an average of about one-half the permitted temperature rise.

(14) F LIGHT BALLAST—Stratfield Co., 434 Grand St., Bridgeport, Conn., is offering a ballast 2¼x1⅞x1⅝₁₆ in. for wattage sizes 4 through 20. Two mounting center sizes are available—standard 3¾ in. or alternate 2⅝ in. UL listed.

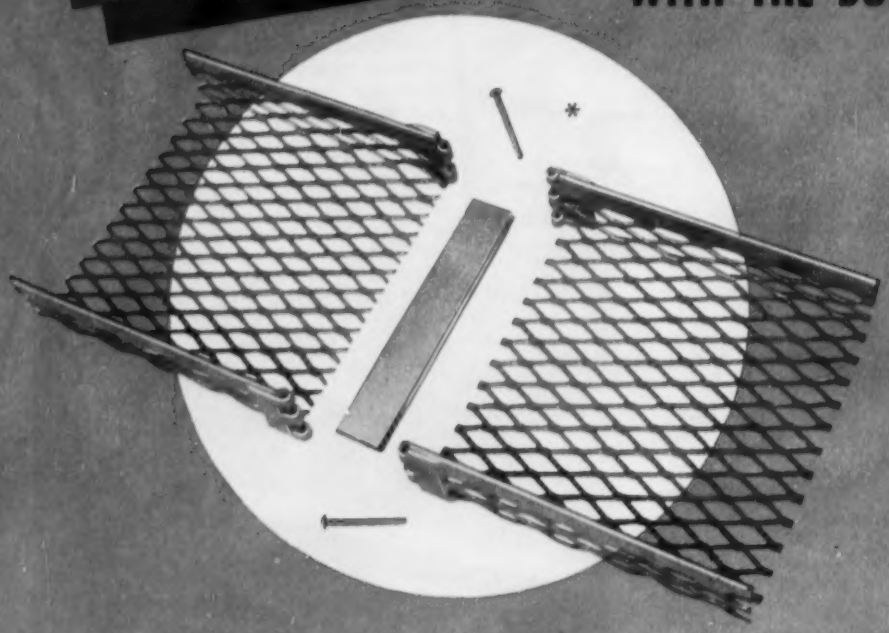
(15) VOLTAGE TESTER—Model AP 1 electrical voltage tester for circuits from 90 to 600 v is available from Craft Laboratories, P. O. Box 606, Westfield, N. J. By substituting an electronic means for a mechanical means, the voltages can be separated by large, easily distinguished marks, the manufacturer states.


CASH REGISTERS RING UNDER SUNBEAM LIGHTING
TOTL
SUNBEAM
visionaire
A welcomed sound to store owners across the country is that of hearing their cash registers ringing up more and more sales after installing Sunbeam lighting. There is no doubt that proper levels of quality illumination engineered to put emphasis on the sales appeal of merchandise noticeably increases the store's business. Among the very many types of Sunbeam fixtures designed for advanced store lighting, the shallow #L1780 series has proved to be exceedingly popular and successful. These units are versatile and efficient and adaptable to various geometrical patterns to suit the architectural needs. Schmidt's Super Market at Lansing, Michigan, shown below, is a typical installation. Inquire how Sunbeam Visionaires® — will solve your store lighting problem.
SUNBEAM LIGHTING COMPANY, 777 EAST 14th PLACE, LOS ANGELES 21, CALIFORNIA

Announcing another Cope FIRST

the new COPE CABLE TROUGH

WITH THE BUILT-IN COUPLER



up to 80% SAVINGS in erection time

The new Cope coupler is an integral part of all units. A metal "Z" shaped piece is also supplied for each joint to fit between the ends of the mesh and thus eliminate sharp edges. Cope Cable Trough Systems are available in widths of 6", 9", 12", 18" and 24" and in straight lengths of 8', 10' and 12'. A wide range of fittings for each width permits the system to be rapidly assembled on the job site to conform to any plant layout.

Should field cutting of the trough be required, special bolt-on couplers are available which will join the cut-off end of the trough to the regular pin-type coupler.

Cope

T. J. COPE, INC.

711 SOUTH 50th ST., PHILADELPHIA 43, PA.

*Patent Pending

ANOTHER EXAMPLE OF Cope LEADERSHIP...

REPRESENTATIVES

AMARILLO, TEXAS
Williamson Sales Co., Box 1324

ATLANTA, GEORGIA
The Gearhart Co., P. O. Box 85, Northside Station

BALTIMORE, MARYLAND
J. D. Amelia, 208 W. Chesapeake Ave., P. O. Box 6759, Towson, Baltimore, Md.

BEAUMONT, TEXAS
Williamson Sales Co., P. O. Box 3164

BIRMINGHAM, ALABAMA
The Gearhart Company, 1727 Sixth Avenue, North

BOSTON, MASSACHUSETTS
J. J. Costello Co., 131 Clarendon Street

BUFFALO, NEW YORK
Vincent J. Brown Co., 564 Ellicott Square

BUTTE, MONTANA
Fred W. Carlson, 604 Utah Avenue

CHARLOTTE, NORTH CAROLINA
Glenn & Larson, 123 Brevard Court

CHICAGO, ILLINOIS
Hooper-Green Co., 407 S. Dearborn St.

CLEVELAND, OHIO
E. F. Burke Agency, 1900 Euclid Avenue

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George R. Horne Company, 22187 Michigan Avenue

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Hooper-Green Company, 319 Marion E. Taylor Bldg.

MIAMI, FLORIDA
The Gearhart Co., 416 Langford Bldg.

MINNEAPOLIS, MINNESOTA
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NEW ORLEANS, LOUISIANA
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NEW YORK, NEW YORK
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Harold E. Bates, Chas. L. Ward Co., 3125 N.W. Grand Blvd.

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Muller, Harper & Assocs., Inc., First National Bank Bldg.

PORTLAND, OREGON
Fred W. Carlson, 935 Northwest 12th St.

ST. LOUIS, MISSOURI
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Marshall Equipment Co., Inc., P. O. Box 28

VANCOUVER, B. C.
Bunston, Ltd., 2532 Yew Street

FOREIGN

MANILA, PHILIPPINE ISLANDS
Communications Electrical Equipment & Supply Co., Inc., 517 Dasmerinas, P. O. Box 58

SANTURCE, PUERTO RICO
Victor M. Garcia, 1357 Ponce de Leon Ave.

The New Cope Cable Trough has a built-in coupler . . . this is typical of the constant efforts of T. J. Cope, Inc. to bring you a stronger and more economical product.

In line with these efforts, Cope pioneered and developed the acceptance of Cope Cable Trough through original design, engineering service and high quality manufacturing standards.

Now Cope has anticipated its many customers' needs for a product which will save up to 80% in erection time and give still greater strength.

Every straight length and fitting in the versatile Cope Cable Trough system now has a built-in coupler—no more nuts, bolts and washers!

The Cope Representative in your territory will be glad to explain the new coupler and show you samples so that you can have the advantage of this latest Cope development in your next new construction program or plant modernization project.

Write today for the new Cope Bulletin which illustrates and describes the New Cope Cable Trough with the built-in coupler. Ask for Bulletin H-2

Hydraulic Press

(16) Burndy Engineering Co. Inc., Norwalk, Conn.

A new hook-head manually operated hydraulic Hypress, type Y35, weighs about 12 lb, delivers 12 tons of compression force. It was developed for installation of an extended size range of Hysplice and Crimpit overhead compression splices and taps, Hylug terminals and Hylink splices.

This device installs overhead transmission and distribution compression connectors on the following range of conductor sizes:

Copper No. 8—400 MCM
Aluminum No. 6—477 MCM
ACSR No. 6—477 MCM
Steel 5/16—⅓ in.
Copperweld No. 8 solid—⅓ in.
Copperweld-copper 8A—2A and 2F—2/0 F

Service tap and entrance connectors and splices accommodated cover the following conductor size ranges:

Copper No. 8—400 MCM
Aluminum No. 6—397.5 MCM
ACSR No. 6—336.4 MCM

The head can be rotated through 180° arc and body and handles are completely covered with molded neoprene insulation. Removable head and ram dies are interchangeable. The hook-head design is said to simplify connector installation on continuous runs of conductor. The ram die can be advanced quickly to the crimping position by manual rotation of the handle, reducing the number of lever strokes required to complete the installation. Crimping depth is controlled by positive limit stops and an overload valve. Release mechanism is actuated by a spring-loaded trigger located near the hand grips.

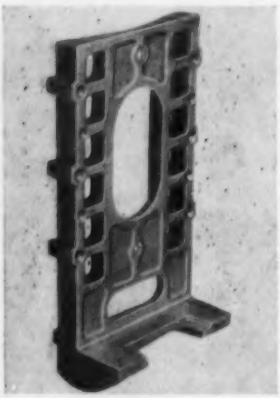
Fill in the Coupon on Page 66

Conduit Fitting

(17) Pyle-National Co., 1334 N. Kostner Ave., Chicago 51, Ill.

A new series of conduit fitting Pylets is designed with interchangeable features to meet requirements for machinery wiring as well as plant maintenance and new construction. Accurate ferrous alloy castings have tapered machine-cut threads, according to the manufacturer, and the large flat-back area is easily drilled for secure mounting on vibrating machines. Interiors are roomy and smooth to facilitate wire pulling and well-rounded edges prevent wire damage. Oval corners have self-retaining screws.

The new series is designated OR.



Fittings

(18) Malleable Iron Fittings Co., Branford, Conn.

This new crossarm gain was designed primarily for use on H-frame structures; is said to provide ample support for the crossarm and to eliminate need for gaining the pole. It is designated PX187.

Through bolt bending and bolt-hole slotting are virtually eliminated since the gain takes the shear load off the bolt, the manufacturer states. Vertical and transverse stability are developed through use of a heel pad, teeth and ribs.

Designed for a wide range of pole diameters, the PX187 is for use on any plank to post installations. It will accommodate arms varying from 7 to 10 in. top to bottom.

(19) TOOL—The Space Arm is an adjustable boom for raising and holding in place pipes, conduits, fixtures and other items up to 25 lb while they are being secured overhead. On each end of the boom are clamping devices that can be attached to or released from articles by remote control. The standard boom adjusts from 8 to 15 ft; on special order can be secured up to 30 ft. Made by Lamp Snatchers Co., 3013 N. Clark St., Chicago 14, Ill.

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Telephone: Garfield 1-4971

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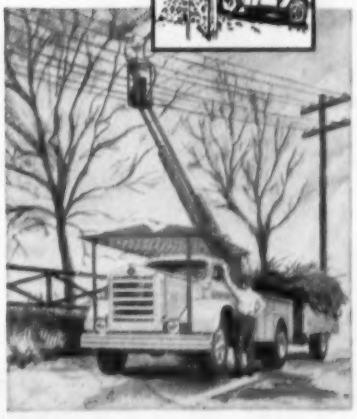

BUILDERS OF AMERICA'S FWD FOREMOST HEAVY-DUTY TRUCKS

MATH-MATIC DESIGN

Write for informative, illustrated folder on FWD units in the weight category you normally use. Four and six wheel drive trucks from 14,500 to 60,000 lbs. G.V.W.

THE FOUR WHEEL DRIVE AUTO COMPANY, CLINTONVILLE, WISCONSIN, *Canadian Factory,* KITCHENER, ONTARIO

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maximum all 'round protection

STEEL CONDUIT

assures rapid, cost-cutting installation

Here is a really new and better steel conduit that assures you the maximum in safety and service life—yet cuts installation costs to the bone.

Eliminates Oxidation and Scale

Rome Rigid is the only rigid steel conduit cold formed from shot-blasted steel. Thus it provides the cleanest surface known, eliminating the oxidation and scale ordinarily present with hot formed pipe.

Electrically Welded for Extra Strength

You can count on superior strength and uniformity of ductility, dimensions and concentricity because Rome Rigid is the only rigid steel conduit that is electrically welded.

Hot-Dip Galvanized

Finally, new Rome Rigid is the one and only rigid steel conduit hot-dip galvanized by the patented Sendzimir* process (the time-proven, superior zinc coating for steel). It has exceptional resistance to corrosion.

Easy to Install

You also can depend on easy cost-cutting installation when you specify Rome Rigid. First, its uniform diameters and careful threading assure easy connections. Second, its mirror smooth, "clean as a shotgun barrel" interior, free from burrs and rough edges, permits easy pulling and eliminates injury to cables.

Available in 10-foot straight lengths, as well as 90° elbows. Sizes are ½" to 6". Fully approved by Underwriters' Laboratories, Inc., Rome Rigid meets all requirements for safe steel raceway . . . plus uniformly high quality. See your electrical wholesaler or call your nearest Rome Cable office today.

*Rome is the first and only manufacturer to apply the famous Armco method of zinc coating to the hot-dip galvanizing of rigid steel conduit.

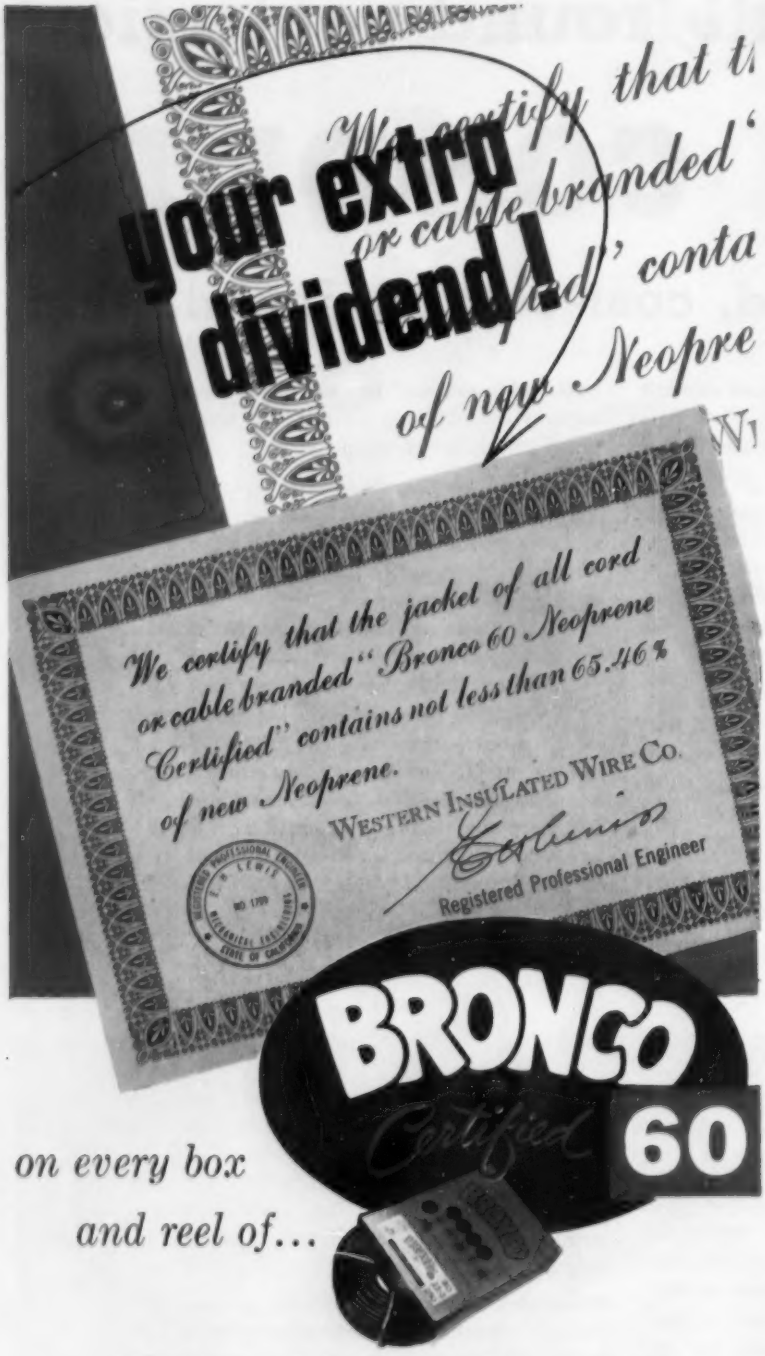
Precisely Heated—In the Sendzimir process, the formed pipe is precisely heated, uniformly oxidizing inside and outside surfaces and completely burning off all surface grease or dirt. Conveyed into another furnace under a carefully controlled reducing atmosphere, the oxide coating is reduced to virgin metal. Actually, the furnace atmosphere of hydrogen combines with the oxygen in the oxide coating to turn the pipe surface to almost the brightness of stainless steel. Here is the cleanest metal surface known.

Never Comes in Contact with Air—Cooled in the same atmosphere to a heat of 850°, just above the temperature of the zinc bath, the bright pipe enters the molten zinc without ever coming in contact with air. Its virgin clean surface is instantly coated with pure zinc, inside and out.

Eliminates Flux—The Sendzimir process produces a superior zinc coating for long-life protection. It eliminates flux which is often trapped and eventually eats its way through the zinc. It provides a uniform bond between bright, clean, raw metal and molten zinc. It is a process that has been used on sheet steel by Armco for fifteen years in establishing a standard of quality unrivalled in the steel industry.

IMMEDIATE DELIVERY!

Ample stocks of rigid and thinwall conduit in all sizes enable Rome Cable to give *you immediate delivery* of these quality products. Write or call us today.


your extra dividend!
We certify that the jacket of all cord or cable branded "Bronco 60 Neoprene Certified" contains not less than 65.46% of new Neoprene.
WESTERN INSULATED WIRE CO.
Registered Professional Engineer
BRONCO
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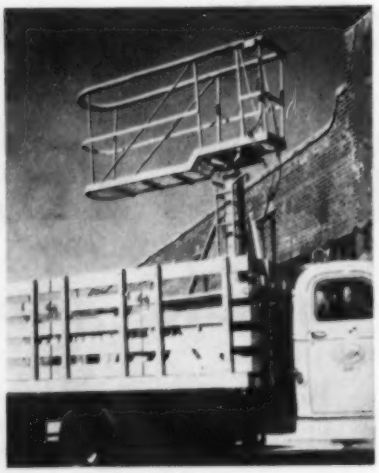
on every box
and reel of...

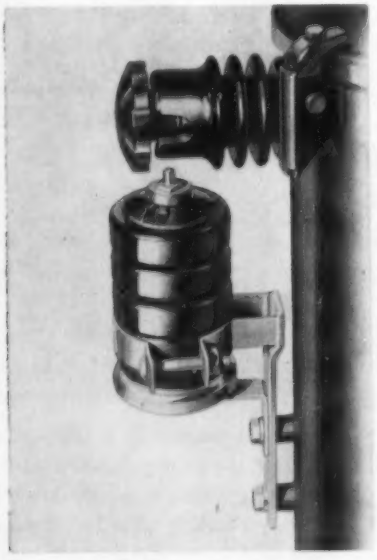
This certification which appears on every box and reel of Bronco 60 Certified portable cable assures you that the protecting jacket contains *a bonus quantity of Neoprene...65.46%!* More Neoprene gives you greater oil-resistance, longer wear, more flexibility. No guesswork. No purchasing by faith alone. You *know* what you are getting. This certificate tells you *exactly* what...and how much. Be sure the wire you buy is *Certified*...and branded.

BRONCO 60 CERTIFIED is sold only through Electrical Wholesale Distributors and is manufactured by

WESTERN INSULATED WIRE CO. • LOS ANGELES 58, CALIFORNIA



(20) EXTENDING TOWER—A Western power company uses this 30-ft extending tower to replace bulbs, clean insulators, trim trees and do other maintenance jobs. The tower is mounted on one of the company's standard trucks; raises or lowers to any height in its 9- to 30-ft range. It is made by General Machine & Welding Works Inc., 1100 E. Second St., Pomona, Calif.



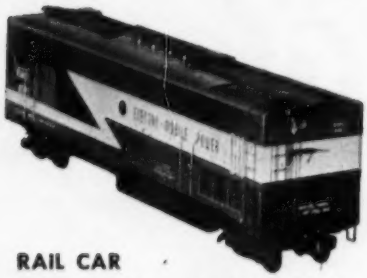
Arresters

(21) Line Material Co., Milwaukee 1, Wis.

Designated type T, these new open gap valve arresters for side or cover mounting on RWP distribution transformers are available in ratings of 10 kv for cover mounting and 3 and 6 kv for sidewall mounting. They feature low impulse sparkover, low IR drop, limiting of 60-cycle follow current and positive interruption of follow current.

To help safeguard Electric Utility service standards—

ELECTRO-MOBILE POWER

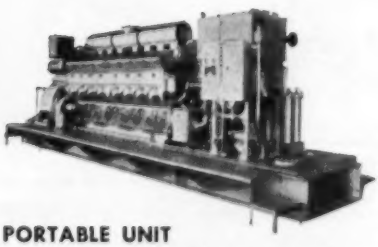


RAIL CAR

1000 and 750 kw. units for use on sidings or placed on piers for semi-permanent use.

TRUCK TRAILER

500 and 350 kw. units to move on highways to desired sites.



PORTABLE UNIT

1000, 750, 500 and 350 kw. capacities for permanent or semi-permanent installations.

HERE'S an economical new power supply for electric utilities to call on when demands get out of balance with supply.

It's General Motors' Electro-Mobile units. They can augment central station capacity for peak skimming—handle fringe area interim boosting—or provide an independent supply wherever the utility company faces a temporary demand.

Placed at strategic points by either rail or highway, they can be used in multiple to fill needs of any amount.

They are surprisingly low in cost, for they are mass-produced. Their dependability is assured by the latest and best in design and manufacturing methods based on long experience in similar lines. Service facilities are nationwide.

And the investment gets long-term protection, because Electro-Motive designs improvements so they may be incorporated in earlier models. Thus the equipment can always be brought abreast of new developments.

Electric utility companies wishing to insure adequate service under all circumstances are invited to write for full details.

ELECTRO-MOBILE POWER FEATURES INCLUDE:

- **Remote control starting and stopping**
- **From starting to full load within 45 seconds**
- **Automatic synchronization with line in phase; frequency and voltage**
- **Full protective equipment, including 3-phase surge capacitors, lightning arresters, over-current relays, field failure relay**
- **Complete self-operation can be provided**
- **Ability to meet higher capacity needs by unit multiplication**
- **Complete national parts and service availability**

ELECTRO-MOTIVE DIVISION

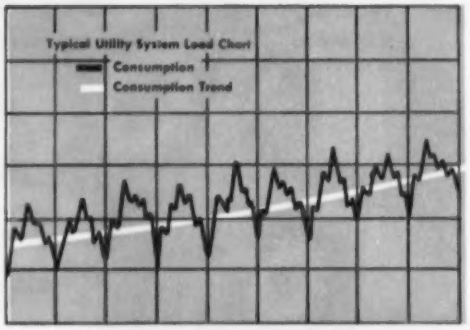
GENERAL MOTORS • LA GRANGE, ILLINOIS

Sold and serviced directly through a manufacturer's organization. Electro-Motive Division offices located in: New York City, Chicago, Jacksonville, St. Louis and San Francisco.

The best assurance of uninterrupted service from sunup to sunup is *dependable equipment.* Moloney has been building transformers to meet the needs of the electric utilities for over 58 years . . . transformers that have proven so serviceable, that the Moloney trademark has become the "Sign of Quality."

So, make it Moloney all along the line . . . power transformers in any Kva rating, load tap changers, regulating equipment, or distribution transformers . . . for you know that Moloney Transformers will serve you and your customers from sunup to sunup —year in and year out.

ME-59-1



Utility demand charts show that more and more electricity is being used around the clock and around the calendar.

MOLONEY ELECTRIC COMPANY

Power Transformers • Distribution Transformers • Step Voltage Regulators • Regulating Transformers • Load Tap Changing Transformers • Load Center Transformers • Unit Substations • Network Transformers • Constant Current Transformers • Capacitors • Transformers For Electronics

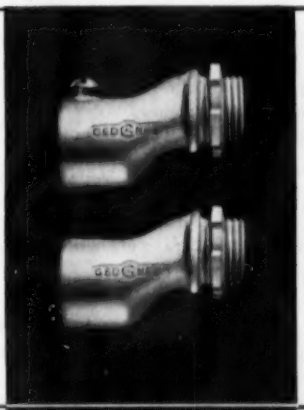
SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

FOR ROCK-BOTTOM INSTALLATION COSTS

SPECIFY GEDNEY!

GEDNEY FITTINGS are machined and threaded with utmost accuracy... smooth-finished, with no metal particles or burrs... made of malleable iron to eliminate breakage... individually inspected to ensure absolutely top quality. That's why they're quickest, least costly to install... Specify Gedney Fittings and you'll find, like thousands of others, that this is the most profitable line available today!

Gedney 90° Pull-In Ells and Adapters with Neoprene gasketed cover and self-retaining screws. These fittings may be used to convert a straight box connector into a 90° connector, or as a 90° box connector for rigid standard pipe coupling. Ells have female threads at both ends. Adapters have male threads at one end and female at the other. Made of malleable iron and cadmium plated. Sizes ½" to 2".



Gedney Offset Connectors—eliminate the necessity for offsetting conduit at knockout entrances of standard boxes. Threaded for rigid, set screw for EMT. Made of malleable iron, cadmium plated, in sizes from ½" to 2".

Gedney Corner Pull-In Elbows are outstanding for space saving, machine wiring, easy wire pulling. Malleable iron, cadmium plated. Made in ½", ¾", 1", 1¼", 1½" and 2" sizes.

Gedney Offset Coupling—female both ends—for use as an offset between boxes. Can also be used with conduit nipple (Gedney 7-50 series) to give more room in box than otherwise possible.
Gedney Offset Nipple, male both ends.

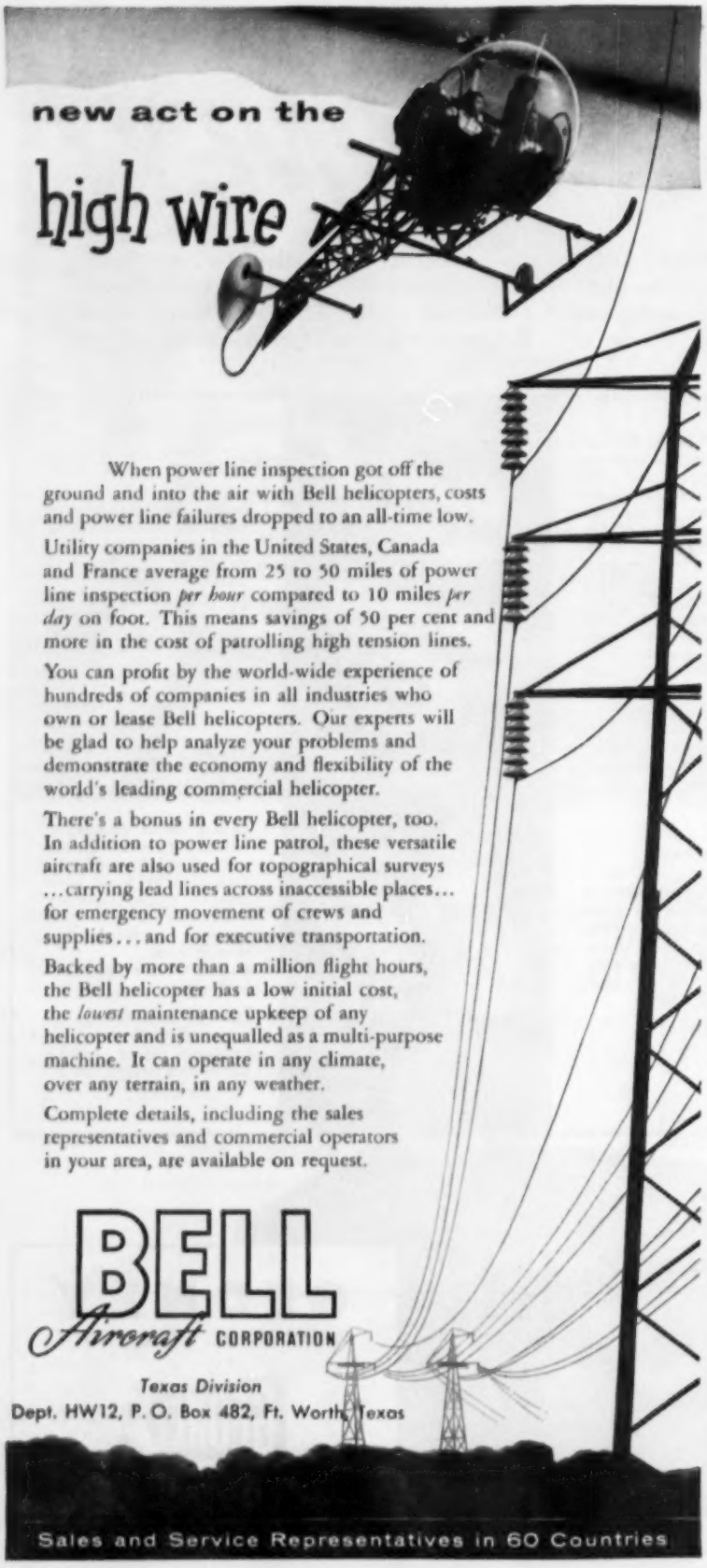
Both of these fittings are made of malleable iron, cadmium plated. Available in sizes from ½" to 2".

GEDNEY FITTINGS FIT

GEDNEY
ELECTRIC COMPANY

GEDNEY

RKO BLDG. • RADIO CITY • NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.



When power line inspection got off the ground and into the air with Bell helicopters, costs and power line failures dropped to an all-time low.

Utility companies in the United States, Canada and France average from 25 to 50 miles of power line inspection *per hour* compared to 10 miles *per day* on foot. This means savings of 50 per cent and more in the cost of patrolling high tension lines.

You can profit by the world-wide experience of hundreds of companies in all industries who own or lease Bell helicopters. Our experts will be glad to help analyze your problems and demonstrate the economy and flexibility of the world's leading commercial helicopter.

There's a bonus in every Bell helicopter, too. In addition to power line patrol, these versatile aircraft are also used for topographical surveys ...carrying lead lines across inaccessible places... for emergency movement of crews and supplies... and for executive transportation.

Backed by more than a million flight hours, the Bell helicopter has a low initial cost, the *lowest* maintenance upkeep of any helicopter and is unequalled as a multi-purpose machine. It can operate in any climate, over any terrain, in any weather.

Complete details, including the sales representatives and commercial operators in your area, are available on request.

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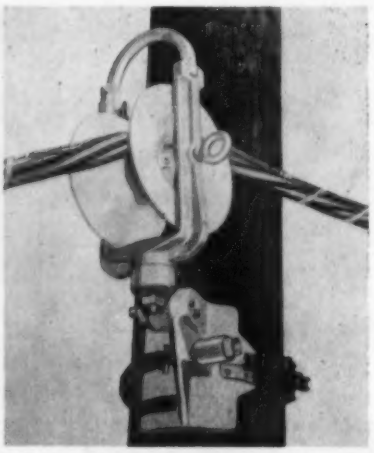

(22) AERIAL CABLE PULLEY — For power companies and electrical contractors, this aluminum alloy pulley weighs less than 25 lb; is designed for a recommended cable load of 600 lb; can be mounted on the pole for crossarm cable attachment. The pulley is built by Tey Mfg. Corp. of Milford, Conn. and is distributed by the Maxwell Equipment Co., Ford St., Milford, Conn. It is designed to allow the lineman at first attempt to position it on the pole by hand prior to securing it with a wrench.

Plugs and Receptacles

(23) Killark Electric Mfg. Co., Vandeventer & Easton Ave., St. Louis 13, Mo.

The new Kilarc explosionproof plugs and receptacles are designed for safety in the electrical connection of portable equipment, according to the manufacturer. Features are: nonsparking; lightweight; rust and corrosionproof. Available in many styles and sizes to fit various boxes and made in 15, 30, 60, 100 amp (100 amp weatherproof). UL listed.

(24) RECEPTACLE — A new dual-purpose unit employing two separate feeds and one return is available from John I. Paulding Inc., New Bedford, Mass. One outlet, constantly alive, gives current for appliances. Several room lights may be controlled at a single wall switch when they are connected to the other outlet. The receptacle is rated for 15 amp at 120 v, 10 amp at 250 v; UL listed.

(25) TIME SWITCH—Designed to provide automatic control for all makes of window air conditioners, one ton capacity and below, the 37UU series time switch has a seven-day dial; can be manually operated without disturbing the sequence of automatic operation. Made by Paragon Electric Co., Two Rivers, Wis.

(26) DRYER CONNECTIONS — A new line of dryer receptacles and cords is being marketed by Eagle Electric Mfg. Co. Inc., Long Island City 1, N..Y. They feature the L-shaped grounding slot and blade; are usable on all 30-amp dryers.

New RLM Specifications for:

1. ALL-WHITE PORCELAIN ENAMEL REFLECTORS (Inside and Outside)
2. INCREASED UPWARD LIGHT
3. MAXIMUM BRIGHTNESS
4. BETTER SHIELDING ANGLES
5. HIGHER REFLECTION FACTORS*
6. HIGHER LIGHT OUTPUT°
7. CAPTIVE LATCHING and HOLDING DEVICE
8. GROUNDED BALLAST MOUNTING
9. CHANNEL DESIGNED for SLIDING HANGERS
10. REVISED LAMP SPACING
11. IMPROVED LAMPHOLDERS
12. ENTIRE UNIT RUST-PROOFED

RLM STANDARDS INSTITUTE

24 FLUORESCENT UNITS

	DIRECT	SEMI-DIRECT	TOTALLY DIRECT
1	Yes	Yes	Optional
2	5%-15%	20%-30%	None
3	Yes	Yes	
4	13°-14°	27°	13°-14°
5	85%	85%	85%
6	83%	77%	80%
7	Yes	Yes	Yes
8	Yes	Yes	Yes
9	Yes	Yes	Yes
10	5"		5"
11	Yes	Yes	Yes
12	Yes	Yes	Yes

22 INCANDESCENT UNITS

*—85%

°—new range from 63% to 80%

NEW RLM SPECIFICATIONS

a new contribution to illuminating engineering progress with

12 ADVANCEMENTS IN INDUSTRIAL LIGHTING!

Both fluorescent and incandescent RLM Specifications for 1955 include important improvements. In step with illuminating engineering progress, RLM Standards take recognition of industry's ever-increasing demand for more light, both on working surfaces and ceilings; better shielding; increased efficiency; easier and lower-cost maintenance.

In addition to the 12 advancements listed here, there are many other important revisions in the new RLM Specifications. These changes bring advantages that make specifying units bearing the RLM Label more important than ever!

A complete compilation of all new RLM Specifications covering 46 different types and sizes of incandescent and fluorescent industrial lighting units, may be found in the new 1955 RLM Specifications Book.

Included are the names and addresses of RLM participating manufacturers who make one or more lighting units bearing the RLM Label. For your complimentary copy, sent without obligation, please address your request on your company letterhead to:

RLM Standards Institute, Suite 815, 326 W. Madison St., Chicago 6, Ill.

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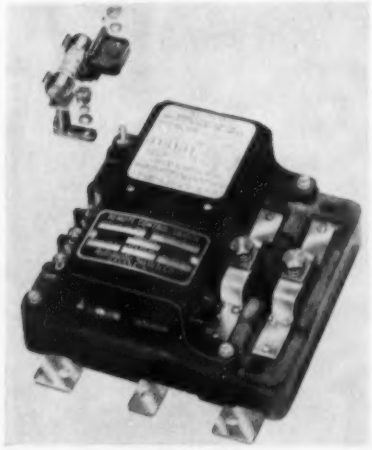
with thanks the good wishes received during
the celebration of our 100th anniversary.
We have been privileged to form many
lasting associations over the past century
and hope to merit their continuance.

Now, on the threshhold of a second century,
we pledge a continuance of the same vigorous pioneering spirit
that produced Kerite insulation and the many
original developments which have protected its integrity
and extended its application.

KERITE CABLE

THE KERITE COMPANY—30 Church St., New York 7, N. Y.
Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston



Remote Control Switch

(27) Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.

A new adaptation of its standard bulletin 920 remote control switch has been announced by this manufacturer. The switch is now available with a control line fuse and adapter. The adapter may be purchased as a separate item and added to an existing remote control or it may be obtained as an integral part of a new switch.

These switches are UL listed to 600 v a-c, 250 v d-c. They may be actuated by push buttons, timers, toggle switches or similar devices. They are designed for simple, low-cost installation on panelboards and switchboards and for separate installation on subpanels, it is stated. Publication 559 gives details.

(28) **BUSHING**—This ½-in. size bushing for electrical connections was designed with a flared skirt for easier starting and deep-cut threads to permit maximum tightening with the fingers. It has prominent raised lugs for final setting with a screwdriver. A smooth curled throat protects wire insulation from cutting or abrasion. Made by National Electric Products Corp., Gateway Center, Pittsburgh 30, Pa.

(29) **CIRCLINE FIXTURES**—A new line of circline lighting fixtures featuring perforated steel louvers has been introduced by Carter Lighting Co., Chelsea 50, Mass.

Where ground must be kept **BARE** *of weeds and grasses...*

BORASCU®
WEED KILLER

BORASCU is the answer to your weed problems! Use this weed killer about stations, transformer and yard areas, fence lines, pole yards-lines, and all places where ground should be kept bare of fire-hazardous and unsightly vegetation. BORASCU destroys and prevents regrowth! A single application may keep an area cleared for 1 to 2 years! And this low-cost material is SAFE...nontoxic, nonflammable... won't corrode ferrous metals. Try it!

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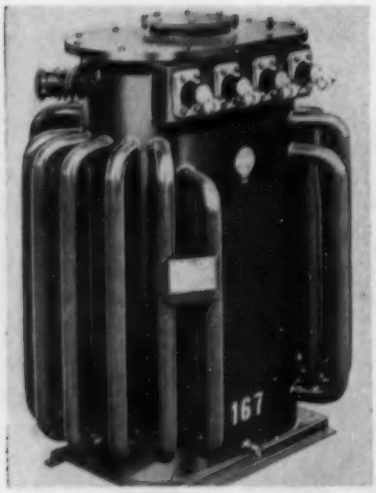


Distribution Transformer

(30) Line Material Co., Milwaukee 1, Wis.

This lightweight 167-kva single-phase distribution transformer utilizes an obround tank, offers reduction in weight and size and has a compact streamlined appearance. It comes in all standard primary voltage ratings through 13,800 v; may be pole mounted to save installation costs.

The new tank design is said to contribute to the improved physical characteristics. All single-phase transformers, 5 through 100 kva, will be redesigned to incorporate the obround tank, the manufacturer states.

Indentor Connector

(31) The Briegel Method Tool Co., Galva, Ill.

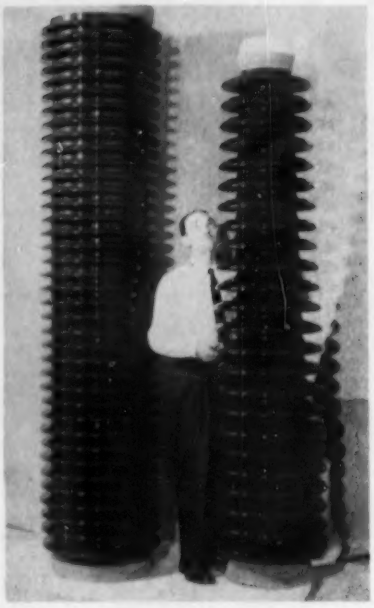
A new insulated-throat indenter-type connector for thin-wall tubing has a permanent locked-in red plastic bushing that covers the entire inside area of the throat and insures a smooth burr-free raceway. The smooth rounded lip of this red plastic bushing protrudes slightly beyond the threads of the connector to protect them and to eliminate shorts and grounds caused by wear in wire insulation from vibration, the manufacturer states. This Red Throat B-M 21B is UL listed as concrete tight.

(32) LANTERN — A sportsman's lantern that combines a 1,200-ft searchlight beam with a wide-angle dome floodlight has been added to the line of Olin Electrical Division, 275 Winchester Ave., New Haven 4, Conn.

Kits

(33) Ohio Carbon Co., 12508 Berea Road, Cleveland 11, Ohio

A new carbon brush kit, number 7-A, contains 20 types and sizes of brushes, with a total of 60. These brushes can be applied to 848 models of motor-driven tools covering 17 makes, the manufacturer states. All brushes are listed in alphabetical order showing types and models of electrical tools to which they can be applied. Other data furnished includes identification of each brush to its application by code number.



(34) PORCELAIN—Believed to be two of the largest pieces of high-voltage porcelain ever produced, these are of one-piece homogenous structure throughout. The one on the left is to house the interrupter unit of a 230-kv oil blast circuit breaker; is 112 in. long, 24 in. outside diameter; weighs 1,325 lb; has 246 in. of leakage distance; will be supplied with ends ground for gasketing and metal flanges cemented for mounting. The piece on the right is for a 230-kv pothead for pressure cable; is 101¼ in. long; weighs 837 lb; will be supplied with ends and conical sections near the ends ground for gasketing. They are made by Lapp Insulator Co. Inc., LeRoy, N. Y.

(35) SPRAY FOR TANKS—L-M capacitor tanks are being aluminum metallized to defer corrosion indefinitely, the manufacturer reports. The new finishing process consists of cleaning and roughening mild steel tanks, applying aluminum spray, following with a chromate primer and ending with a dark alkyd enamel. The dark finish expedites heat radiation and keeps capacitor packs at low operating temperatures. Details may be secured from Line Material Co., Milwaukee 1, Wis.

Aerial Beam

(36) McCabe-Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo.

The Sky-Master hydraulic aerial beam consists of a revolving mast and a pair of hydraulically actuated beams built to carry two men up, out, over or down to any position within the operating range.

Supporting mast, which rotates on roller bearings, can be revolved continuously in either direction. Inner beam can be moved to any point in an 85° arc. Outer beam, moved hydraulically in combination with drive pulleys and ¾-in. wire rope, can be spotted in any position within an operating arc of approximately 265°. Movement of mast and each beam is controlled by independent levers installed beside twin work baskets connected to the outer beam. These work baskets can be moved around obstacles to reach working position; remain in horizontal position at all times.

Sky-Master comes in two sizes, installed on the manufacturer's body or on a unit designed to fit individual requirements. Series AB-37 has a maximum ground-to-basket floor height of 37 ft; enables two men to reach working areas 42 ft above the ground. Series A-43 is 43 ft; provides working height of 48 ft. Details in bulletin 410.

(37) FOR HAZARDOUS LOCATIONS—A new line of circuit breakers and motor-starting switches has been added to the Pylet line of explosion-proof and dust-tight electrical fittings. They are designed for class 1, groups C and D; Class II, groups E, F and G; Class III. They are available in single or two-gang types with dead-end or through-feed hub arrangement, ½-, ¾- and 1-in. sizes. Ratings: circuit breakers up to 30 amp, 120 v a-c; motor starters up to 1 hp. Made by Pyle-National Co., 1334 N. Kostner Ave., Chicago 51, Ill.

all these specialists

will help you get business

Here is a top talent team, a team of specialists. They are your own local people.

Their job is to help contractors *like yourself* on any problem concerning electrical supplies and equipment. For instance, a rewiring job . . . or a technical application of motors and control equipment . . . or a lighting installation. It may be a simple problem or one as complex as you can imagine. It may require advice and counsel about breaking production "bottlenecks."

These men are attached to your own local GESCO warehouse. They augment the service offered through GESCO . . . complete stocks, leading makes, fast deliveries.

The man who regularly contacts you from GESCO is himself well-equipped to serve you. He knows inventory control and sales promotion. He is experienced in the tough problems you bump into day by day. *And* he is supplemented by this top talent team.

To aid in meeting your problem in electrical supplies and equipment, there is help waiting for you at the local GESCO office!

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A DIVISION OF GENERAL ELECTRIC DISTRIBUTING CORPORATION

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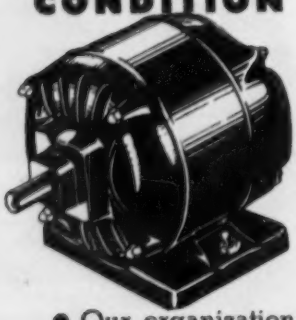
SAN DIEGO • BAKERSFIELD • PHOENIX • TUCSON • SEATTLE • PORTLAND • MEDFORD • TACOMA • SPOKANE

OHIO MOTOR AND GENERATOR BRUSHES
KEEP
YOUR MOTOR IN
Tip Top
CONDITION



• Our organization develops and manufactures brushes from raw materials thru to the finished product. Although we carry standard items in stock, for your convenience we also maintain a complete engineering staff to assist you in the selection and application of correct brushes for your equipment. We base our 37 years of reputable existence upon our SERVICE to INDUSTRY.

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BULLETINS ETC.

(38) DISTRIBUTION TRANSFORMERS—How its protected distribution transformers help the utility is told in an eight-page bulletin from Allis-Chalmers. The transformer is available in ratings of 3 through 100 kva, 2,400 to 14,400 v. Copies of this bulletin 61B7309B are available from the manufacturer at 939 S. 70th St., Milwaukee 1, Wis.

(39) SCHOOL LIGHTING—The ABC's of School Lighting has been revised and is available from Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, Pa.

(40) INDUSTRIAL FILMS—A new edition of a catalog describing industrial motion pictures that it sponsors and distributes has been prepared by United States Steel Corp., 525 William Penn Place, Pittsburgh 20, Pa.

(41) GLOVES — Wicx-Merit Glove Co., 1121 Seventh St., Oakland 20, Calif., is offering a new data sheet on its line of gloves for the electrical industry. It lists linemen's gloves and protective covers; foremen's-type gloves and a type for meter readers, warehousemen and others.

(42) TRUCK EQUIPMENT — Its line of utility truck equipment is described in a new six-page abbreviated catalog-bulletin by Tel-E-Lect Products Inc., 10,001 Minnetonka Blvd., Minneapolis 16, Minn.

(43) LIGHTING — "Interpretation and Use of Candlepower Distribution Reports" is the first in a new series of engineering publications to be offered by Sunbeam Lighting Co., 777 E. 14th Place, Los Angeles 21, Calif. They are available to utility lighting personnel and electrical engineers.

(44) TRANSFORMERS—Design features of a new line of distribution transformers are shown through the medium of Trans-Vision pages in a booklet from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. Principal features of the single-phase, 3 to 167 kva, pole-type transformers are discussed in sections.

(45) TRANSFORMERS—Moloney's new bulletin H-305A is a revision of bulletin H-305 covering HiperCore distribution transformers, single phase, 15,000 v and below, 167 kva and below. The 27-page bulletin is available from Moloney Mfg. Co., St. Louis, Mo.

(46) PANELBOARDS—Descriptive bulletins covering its complete line of distribution and lighting panelboards is offered by the General Electric Co. Distribution Assemblies Department, Plainville, Conn.

(47) CONNECTORS — Power connectors for aluminum and copper conductors are listed in a new catalog issued by Delta-Star Electric Division, H. K. Porter Co., 2437 Fulton St., Chicago 12, Ill.

(48) TRUCK LAWS—A compilation of state laws and regulations limiting size and weight of trailers is available to owners and operators from Four Wheel Drive Auto Co., Clintonville, Wis.

(49) LIGHTING — New catalog sheets and binder index form OD-627 have been issued by Day-Brite Lighting Inc., 5411 Bulwer Ave., St. Louis 7, Mo.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after April 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

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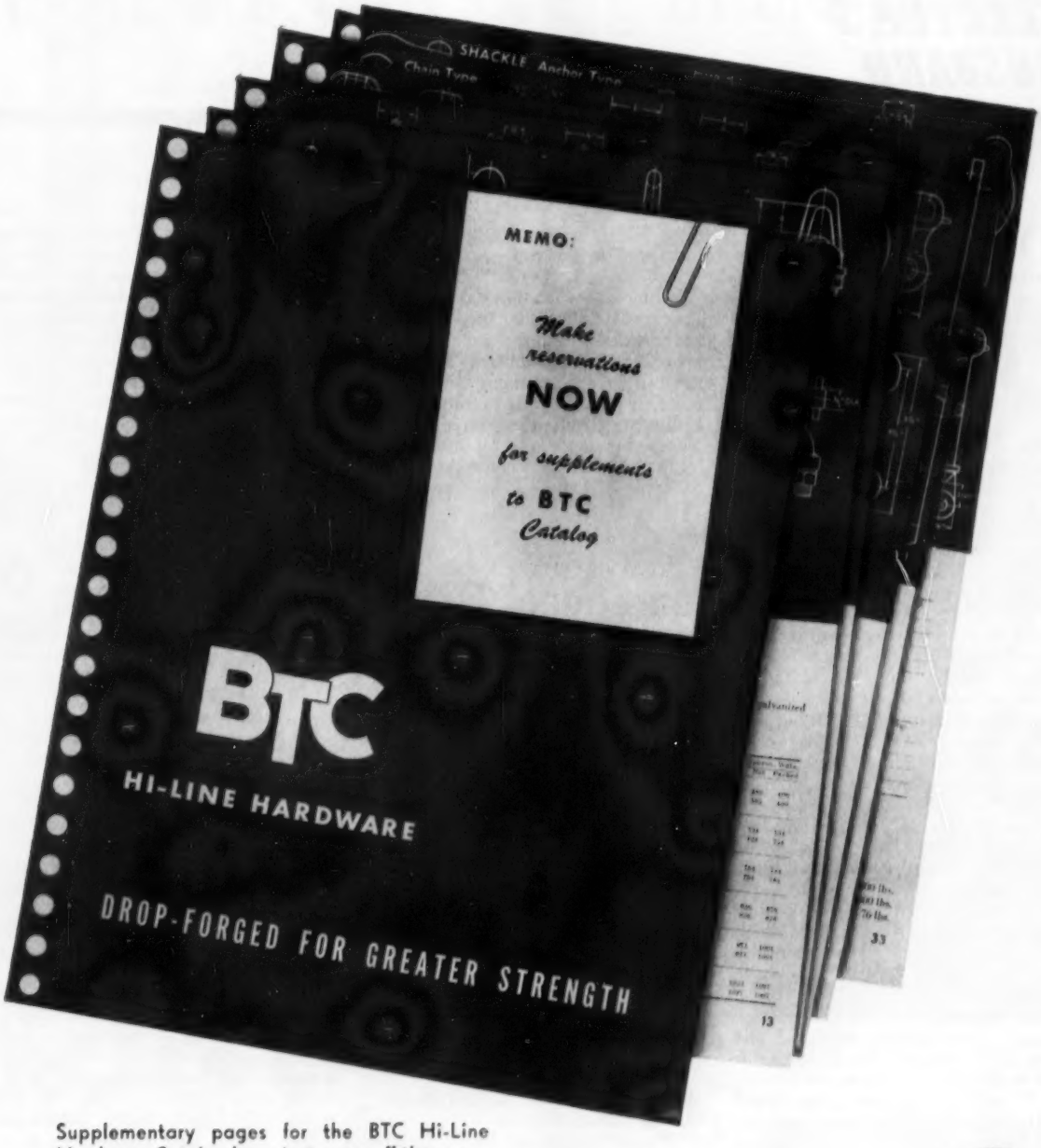

Supplementary pages for the BTC Hi-Line Hardware Catalog have just come off the press. These supplements contain blueprints and complete specifications on revisions and additions to our line of Drop-Forged Steel and Aluminum Hi-Line Hardware.

Send for these free supplementary pages and bring your BTC Catalog up-to-date. If you do not already have a catalog, indicate on coupon and a complete, revised copy will be mailed to you without charge.

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ELECTRA'S HUSBAND

"DON'T tell me that you are thinking of going back to college," Electra said one night as she was looking over the canceled checks that accompanied last month's bank statement. "If not, then what is this check for that's made out to the Regents of the University of California?"

"No, I'm not going back to college although sometimes I think I should," I answered. "The check is for a scholarship fund that is supported partly by alumni and partly by the university. It's a typical activity that a lot of alumni, irrespective of their college or university, should recognize and do something about."

"I don't get what you're driving at," Electra said. "Why should you or anyone else be worried about his alma mater?"

"Well maybe my case isn't typical because Cal gets the major portion of its money from the state, but about half of the 900-odd colleges and universities that are not state supported are in financial trouble," I explained. "It's a deadly serious problem and one that is a threat to our whole higher educational system. That's why I say that alumni as well as the businesses and industries, which draw upon these schools for graduates, ought to be concerned. With more and more youngsters coming up for enrollment the situation is going to get worse."

"But the kind of colleges you are talking about charge tuition," she argued. "Remember that it cost your brother-in-law a pretty penny for tuition to send our nephew to Stanford."

"If the facts were known, the tuition paid for only about 70% of what the university spent to educate him," I explained. "The rest came from endowment income. In a lot of colleges there would have been a deficit. All of the colleges are in a real financial squeeze today and those that can't call upon the taxpayers for additional funds are especially hard hit. Increased enrollments, 50c dollars, higher costs, a dearth of endowment money, more costly courses because of greater interest in science and technology, underpaid faculties—all of these things have the private colleges in a tight spot. They need help desperately. Do I make myself clear?"

"I suppose so, but then who isn't affected by inflation," she said resignedly. "Don't philanthropists give a lot of money to the colleges and universities?"

"Time was when they did," I replied, "but millionaires like those who initially endowed most of the schools are being taxed into extinction. That's why the burden of supplying new money must be picked up by alumni — especially those in the medium and higher income brackets—and by business and industry. There are reputedly something like 300 alumni fund-raising programs that dig up $70-odd million a year. But that is only a small proportion of the $300 or $400 million of new money that is needed.

Educational Funds— A Responsibility

"You know the desire for a college education is greater than ever before and the demand of industry, business and government for college graduates is constantly expanding. Business and industry are directly dependent upon the colleges and universities for the people who will operate and manage the increasingly complex organizations our dynamic economy requires."

"Maybe they are the ones that should put up the needed money," Electra mused.

"You're right as can be," I declared emphatically. "And some companies are accepting the responsibility. I've seen several instances in the last couple of months. For instance for all of 1955 General Electric will match any gift up to $1,000 that one of its college graduate employees wants to make to his or her alma mater. G-E has something over 23,000 college graduates on its pay rolls from 540 different U. S. colleges and universities. They call it the corporate alumnus program and the money comes from a special education and charitable fund. The program is based on the feeling that alumni represent one of the great untapped sources of continuing support for higher education. Phil Reed has said that while the individual graduate profits most from his education the organization that employs him derives some benefits also. Because the real cost of a college education is seldom covered by the tuition paid, he believes that this plan serves to repay some of the debt the graduate has incurred."

"That's a good scheme," Electra commented. "Why don't more companies follow suit?"

"Some are," I continued. "For instance Columbia Broadcasting System through the CBS Foundation has just made grants to 14 privately supported colleges and universities in behalf of 16 executives of the company who are graduates of those schools. The gifts, which amount to $2,000 for each graduate, are unrestricted as to use so the colleges can do whatever they want with the money.

"My friend, Frank Stanton, president of CBS, says that the company believes this is a way of demonstrating its belief in and support of the American system of privately endowed higher education. Such colleges and universities, in his opinion, need all the support they can get from private sources—individuals, corporations and foundations—if they are to continue to produce the informed and trained citizens on which our political and industrial democracy depends."

"Somebody ought to give Mr. Stanton an orchid," Electra commented.

"There are some other equally foresighted and conscientious companies," I continued. "I was reading in *Business Week* that General Foods has just given $270,000 to higher education. Three liberal arts colleges each received $25,000 and the balance went to associations and funds that support such schools. The largest contribution was made by Standard Oil Co. of New Jersey. It split $450,000 among 138 privately endowed institutions and gave another $50,000 to the National Fund for Medical Education. Westinghouse, Union Carbide and du Pont are others that have established programs for giving. U. S. Steel is another."

"It seems to me that you have been listing mostly corporate giants," Electra commented. "Don't smaller companies get into this act?"

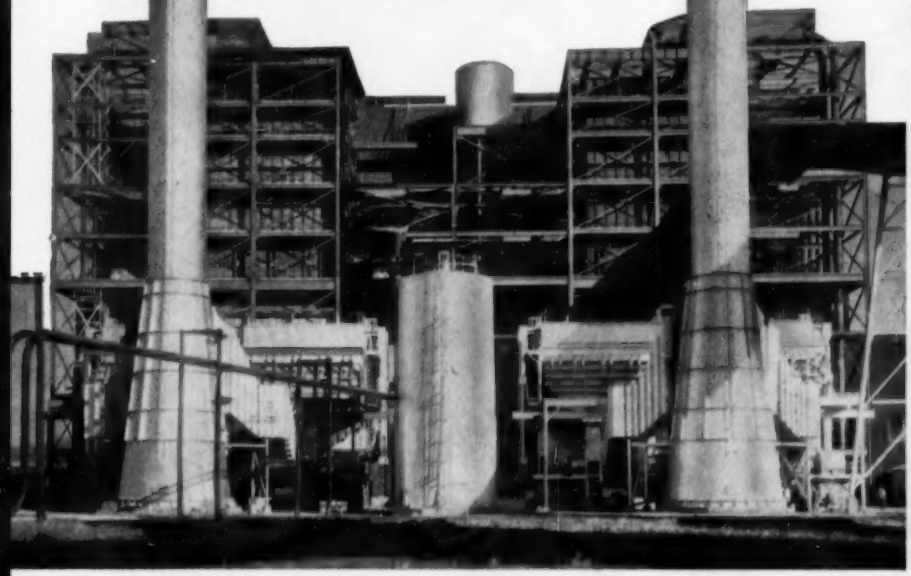
"Not many," I said. "But it is the big companies that are the bellwethers. In time the others will follow."

What are they using at Meramec?

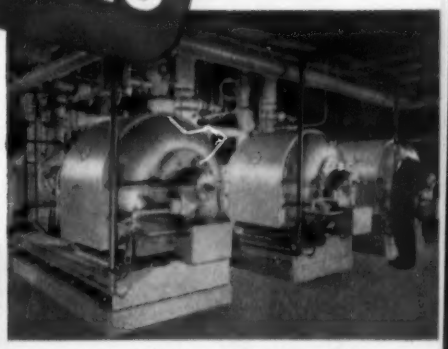
Another utility uses Allis-Chalmers motors. At Union Electric Company's new Meramec plant, all motors for all auxiliaries were furnished by Allis-Chalmers.

Allis-Chalmers builds a complete line of integral horsepower motors for power plant service. Your A-C representative will be glad to help you select the best motors to meet your needs.

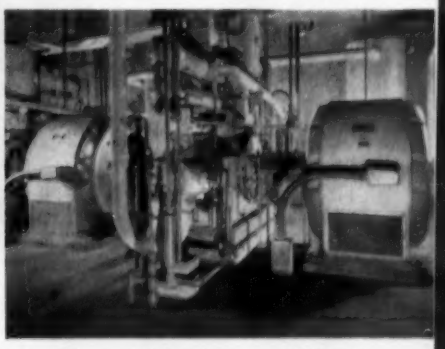
ALLIS-CHALMERS
Auxiliary-Drive
MOTORS



Built in the modern semi-outdoor style, Union Electric Company's Meramec station has two units with a total installed capacity of 250,000 kw.



Three of six 1500-hp, 3580-rpm, 4000-volt Allis-Chalmers two-pole motors driving boiler feed pumps.



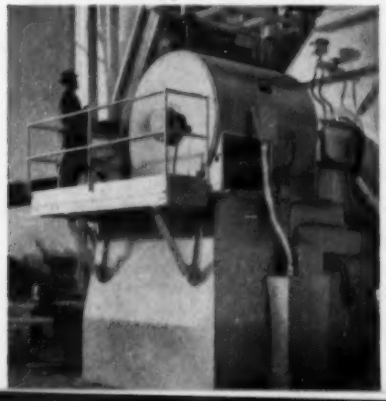
Two of three 300-hp, 353-rpm, 4000-volt Allis-Chalmers squirrel-cage motors driving soot blower air compressors.

ALLIS-CHALMERS

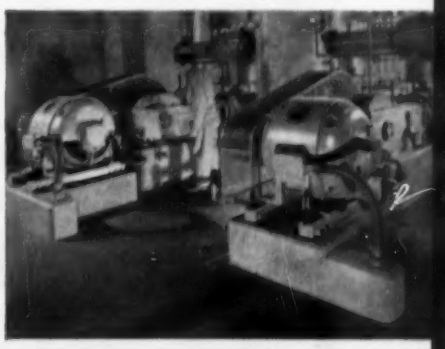
Milwaukee 1, Wisconsin

A-C

Each induced draft fan is powered by an Allis-Chalmers 1000-hp, 710-rpm, 4000-volt tube-type TEFC motor.



Four of these 500-hp, 425-rpm, 4000-volt vertical pipe-ventilated motors drive condenser circulating pumps.

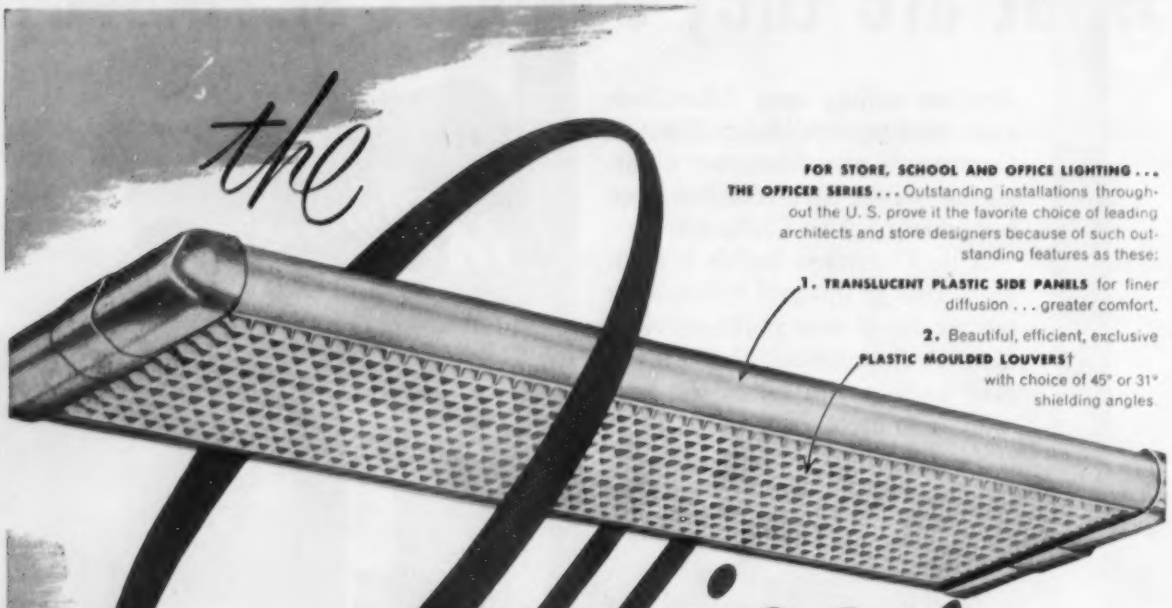


These compressors provide air for service lines . . . are driven by Allis-Chalmers 100-hp, 1170-rpm, 440-volt cage motors.

A-4526

the Officer

for Interiors of Distinction



FOR STORE, SCHOOL AND OFFICE LIGHTING . . . THE OFFICER SERIES . . . Outstanding installations throughout the U. S. prove it the favorite choice of leading architects and store designers because of such outstanding features as these:

1. TRANSLUCENT PLASTIC SIDE PANELS for finer diffusion . . . greater comfort.

2. Beautiful, efficient, exclusive **PLASTIC MOULDED LOUVERS†** with choice of 45° or 31° shielding angles.

VERSATILITY in Lighting Layout makes easy custom-to-order installations

SPECIAL COUPLERS for Specialized Lighting include famous Holophane Controllens*, Direclite, spotlite, etc. *Copyright, The Holophane Co.

precision-straight **PLASTIC MOULDED LOUVERS†** Years ahead in beauty and utility! Warp-proof . . . the ultimate . . . in beauty and practicability.

Featherweight

†Made under patent 2566817

Distinctive . . . years-ahead styling . . . Yes, you have only to see the Officer in operation to appreciate its outstanding beauty . . . its harmony of line which fits it for every interior of distinction.

Distinctive, too, in its years-ahead versatility, the Officer Series has the adaptability to fit it to every lighting need . . . to special room arrangements . . . to special spot effects.

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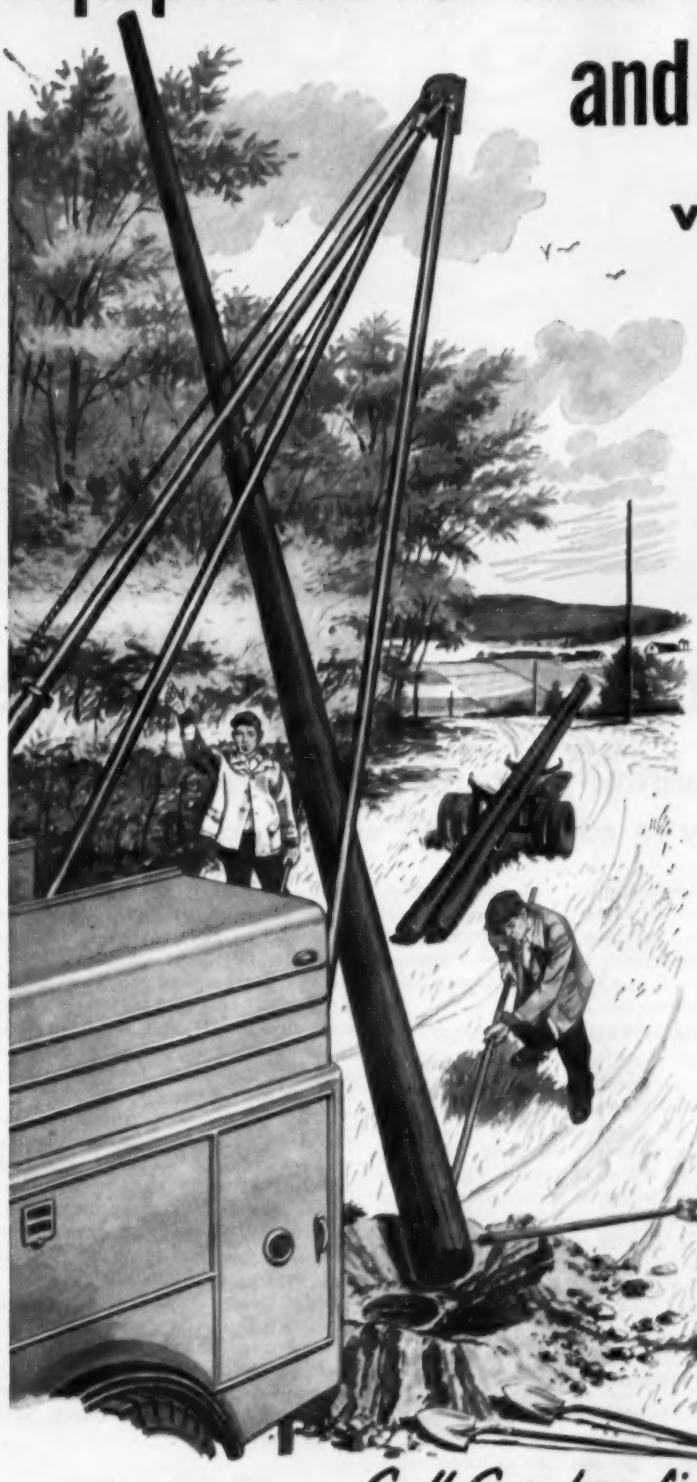

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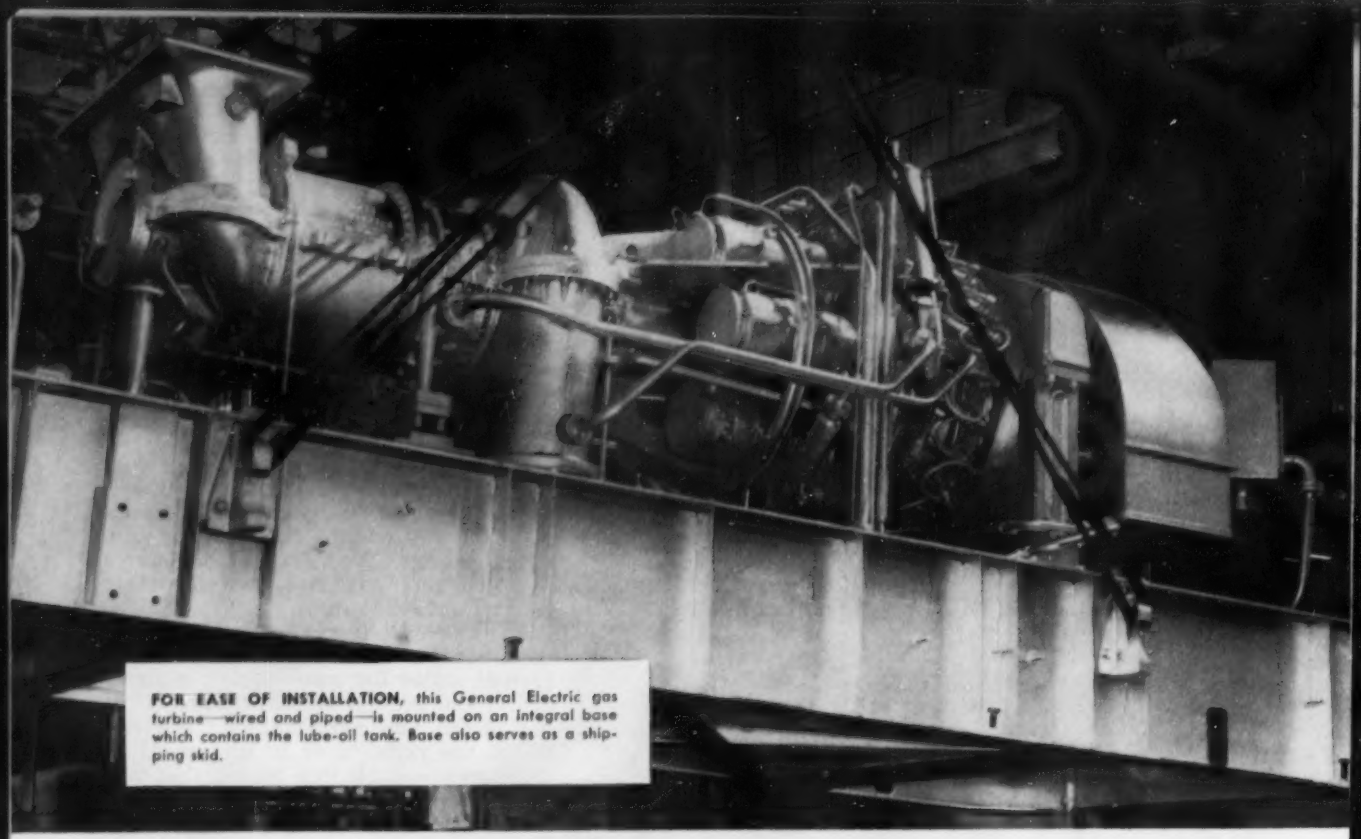
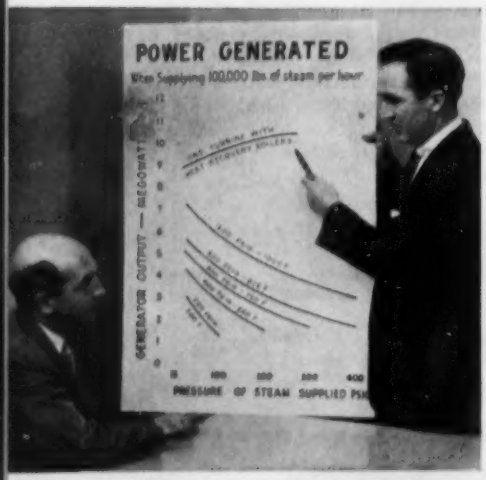


FOR EASE OF INSTALLATION, this General Electric gas turbine—wired and piped—is mounted on an integral base which contains the lube-oil tank. Base also serves as a shipping skid.

Gas turbines can mean new system economies

Operating records confirm that they can boost station capacity and efficiency in combination with steam turbines


POWER GENERATED
When Supplying 100,000 lbs of steam per hour
GENERATOR OUTPUT — MEGAWATTS
PRESSURE OF STEAM SUPPLIED PSI

IMPROVED PLANT EFFICIENCY results from gas turbine's ability to produce steam with hot exhaust gases. A. G. Mellor, Power Generation Engineer (left) and J. R. Casey, Manager—Gas Turbine Marketing, discuss economies resulting from obtaining steam from gas turbines for use in steam turbine cycles.

Field reports on gas turbine performance plus recent design advances add up to a new approach for many electric utilities to improve efficiency at attractively low dollar investment per kilowatt.

GAS-STEAM TURBINE CYCLE

Simple cycle gas turbines can be used in combination with steam turbines, where the hot exhaust gases from the gas turbine are reclaimed in a recuperator to heat the feed water in the steam cycle. This offers the possibility of increasing station capacity beyond the rating of the gas turbine and increasing station efficiency. In the Rio Pecos station on West Texas Utilities' system, for example, a 5000-kw unit advanced station capacity by 6611 kw, lowering station heat rate by 15.2 percent at the same time.

NEW TECHNOLOGICAL ADVANCES

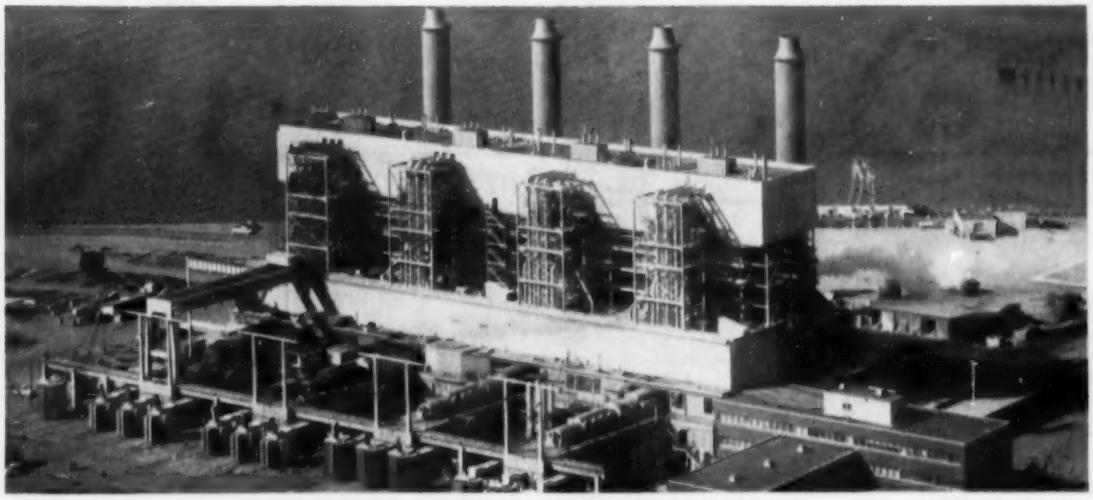
General Electric has built and installed 17 gas turbine units in electric utility plants. This is over 90 percent of the gas-turbine generators in use today in this country's utility industry, and it represents an unequalled fund of design and field experience. This extensive practical background has resulted in improved designs and reduced installation costs. Gas turbines now can be used for small and medium base-load plants, end-of-line generation, standby, and peak-load stations, as well as topping units.

Most utilities are confronted with the need to step up system capacity and efficiency. In looking for an answer, recently the question has been asked, "What about the gas turbine?" More and more, the answer, based on technological advances and performance reports, is "Sounds good! Let's investigate." Ask your G-E Apparatus Sales representative for details on how the gas turbine can fit into your utility expansion programs, or write General Electric Co., Section 301-283, Schenectady 5, N. Y.

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S. VOL. 114 NO. 2 FEBRUARY 1955



Pacific Gas and Electric Co.

Quickening tempo of Western expansion assures

NEW HORIZONS AND OPPORTUNITIES

The Far West will continue to thrive in '55. Cities and towns burst at the seams. New farms blossom where before there was only desert. Industries spring up where formerly cattle fed in fertile fields or orchards hung heavy with fruit. New homes by the thousands, new shopping centers, schools and churches rise on the fringes of metropolitan areas and in rural cities and towns. It is all part of a visible growth that is rooted in a constantly expanding population and in a dynamic, vibrant economy.

No better gage of this expansion of population, farms, businesses and industries can be found than in the statistics of electrical growth. Electric energy use last year in the 11 Western states increased 6.2%; the national rate of growth was only 5.6%. The total number of electric customers served by Western utilities now exceeds 7,630,000 —up more than 300,000 from a year ago. To meet the ever-increasing demands of these customers, utilities and government agencies last year added 2,213,502 kw of new generating capacity—an all-time high for the region. Expansion programs such as this take money and expenditures soared. Utilities—private and public—spent $523,032,200 in 1954 and the federal government's Western power program added another $181,101,040. Combined peak load on all systems went up 10.3% in 1954 to 18,760,932 kw.

For 1955 the tempo of growth will remain high. Energy use is currently running 12-14% ahead of a year ago. The 1955 expansion program for generation calls for 2,107,100 kw of new capacity. Utilities have budgeted $470,021,250 for new facilities. The slight decrease below 1954 is accounted for by the temporary lull in new capacity additions as load catches up with the new installations. This is a national trend as well. More money will be expended for transmission and distribution facilities than ever before. When the federal government's contemplated power expenditures are added, the total comes to $650,960,250 for 1955.

The high level of construction that marked 1954 as the second best year in history should continue over into 1955 by all the signs and portents. Home building reflects the stimulation of liberal financing terms, readily available mortgage money and population and family formation increases. Estimates are that 1955 will see a 10% increase over the 271,000 new dwelling units and $2,280,000,000 expenditures of last year. The same factors influence engineering construction because utility services, highways and schools are needed in direct ratio to the population increases. Thus 1954's total of $2,198,726,000 should be exceeded, giving the Far West a total construction volume of more than $4½ billion.

On the appliance side the same factors that brought sales to new peaks during the closing months of 1954 are carrying over into this year. True, there are perennial problems—the discount house, the shortage of trained salesmen and rugged competition—but these are offset by intensified cooperative promotion and sales effort by the utilities. Estimates are that the 5,788,344 domestic and rural electric customers will buy more than $750,000,000 of new appliances.

As has every new year here in the West during the past decade, 1955 promises plenty of new horizons and new opportunities.

Table I—Comparison of National to Western Operations for 1953 and 1954

	11 Western States		United States		Per Cent West to U.S.	
	1953	1954	1953	1954	1953	1954
Energy generated (thousands of kwh)	86,697,976	92,106,846	442,656,831	467,244,952	19.6	19.7
Energy generated in hydro plants (thousands of kwh)	61,336,361	64,164,411	105,185,541	106,750,080	58.3	60.0
Energy generated in fuel plants (thousands of kwh)	25,361,615	27,942,075	337,471,290	360,494,512	7.5	7.8
Percentage of hydro to total generated	70.8	69.7	23.8	22.8	...	...
Installed generator capacity (kw)	16,330,648	18,154,587	88,617,609	100,007,221	18.4	18.1
Installed hydro generator capacity (kw)	10,519,311	11,294,336	21,649,117	22,958,652	48.6	49.3
Installed fuel generator capacity (kw)	5,811,337	6,464,721	66,968,312	77,048,569	8.7	8.4
Revenue from energy sales (thousands of dollars)	960,612	1,026,000	6,793,660	7,270,000	14.1	14.1

Sources: Generation and capacity, Federal Power Commission; revenue, Edison Electric Institute. 1954 estimate on 11 months' operations.

Table II—Ten-Year Generation Record for Western Public Utilities (in thousands of kwh)

	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954*
Arizona	3,435,988	2,823,650	2,769,495	3,282,118	3,434,189	3,489,309	3,960,041	6,344,000	5,438,401	5,388,770
California	15,943,740	17,313,659	19,441,429	20,286,893	22,112,191	24,835,775	29,375,692	29,251,000	35,062,488	37,379,056
Colorado	1,128,655	1,168,151	1,375,653	1,592,067	1,630,959	1,855,610	2,263,192	2,316,000	2,731,390	3,439,297
Idaho	1,263,032	1,334,914	1,507,474	1,622,107	1,840,226	2,537,648	2,915,242	3,729,000	3,850,099	3,922,723
Montana	2,318,130	2,465,805	2,764,383	2,869,825	2,915,361	3,136,251	3,303,612	3,780,000	3,727,297	4,118,690
Nevada	2,590,404	2,488,076	2,908,189	3,607,239	3,591,363	3,210,425	2,547,243	3,568,000	2,127,373	1,988,182
New Mexico	556,892	604,992	753,897	845,696	910,885	1,014,453	1,171,878	1,357,000	1,545,681	1,593,307
Oregon	4,183,748	4,148,566	5,456,577	5,433,228	5,291,441	5,544,548	5,975,489	6,661,000	6,891,347	8,940,520
Utah	416,956	457,169	562,198	600,208	614,598	658,571	824,318	1,113,000	1,571,054	1,694,415
Washington	9,689,862	9,038,842	11,230,994	13,881,239	15,079,298	17,370,986	19,914,385	19,463,000	22,933,252	26,748,045
Wyoming	263,403	315,898	325,684	388,656	506,207	594,812	638,386	865,000	835,737	629,800

FPC reports *12 months ending November

Table III—Type and Capacity of Generators, November 1954

	Number of Utilities	Number of Plants	Total Capacity Kilowatts	Generator Capacity in Kilowatts of Plants Operated by: Water Power		Steam Power		Internal Combustion Engines	
				Number	Capacity	Number	Capacity	Number	Capacity
Arizona	15	46	1,525,386	13	980,080	11	477,950	22	67,356
California	20	168	7,411,198	127	2,895,507	31	4,470,825	10	44,866
Colorado	37	77	845,353	28	248,317	23	562,398	26	34,638
Idaho	11	48	739,367	42	734,980	..	.....	6	4,387
Montana	9	27	869,294	19	794,970	4	71,800	4	2,524
Nevada	7	16	597,088	9	586,180	..	.....	7	10,908
New Mexico	17	34	377,359	4	24,910	12	303,072	18	49,377
Oregon	16	71	1,532,676	53	1,328,399	12	198,710	6	5,567
Utah	26	85	362,606	60	94,325	6	237,500	19	30,781
Washington	20	55	3,700,212	40	3,499,286	8	196,820	7	4,106
Wyoming	21	50	194,048	18	107,382	11	74,320	21	12,346
11 Western States	199	677	18,154,587	413	11,294,336	118	6,593,395	146	266,856
United States	1,450	3,668	100,007,221	1,392	22,958,652	1,051	74,773,035	1,225	2,275,534

Source: Federal Power Commission

Table IV—Power Company, Federal, Municipal and Power District Systems Construction Expenditures—11 Western States Compared with U. S.

Year	U. S.	11 Western States	Per Cent West to U. S.	Year	U. S.	11 Western States	Per Cent West to U. S.
1942	455,975,000	73,000,000	16.0	1949	2,517,614,000	422,000,000	16.8
1943	306,246,000	83,470,000	27.3	1950	2,347,171,000	362,519,000	15.4
1944	340,284,000	70,000,000	20.6	1951	2,443,324,000	425,195,556	17.4
1945	408,992,000	69,000,000	16.9	1952	2,901,250,000	491,315,000	16.9
1946	718,169,000	105,000,000	14.6	1953	3,187,489,000	490,664,000	15.4
1947	1,372,145,000	254,332,455	18.5	1954	3,997,669,000*	713,133,240*	17.8
1948	2,078,088,000	375,000,000	18.0	1955	3,868,060,000	650,959,250	16.8

* Federal agencies not included prior to 1954.

1954 Record 1955 Outlook

Production Electrical energy production in the 11 Western states for 1954 was 92,106,486,000 kwh. This compares with 86,697,976,000 kwh for 1953, an increase of 6.2%. Generation for the West was 19.7% of the U. S. total, a slight increase from the 19.6% for the previous year. In 1954 hydro generation in the West was 69.6% and thermal generation 31.4% of the total generation. In 1953 hydro generation was 70.7% of the total, indicating that hydro and steam generation are both increasing at approximately the same rate.

Capacity Total installed capacity of power plants in the West was 18,154,587 kw as of November 1954, according to FPC figures. This is an increase of 7.9% over the capacity figure of 16,831,000 kw for 1953. During 1954 there were installed 2,213,502 kw of new plant capacity, as reported to ELECTRICAL WEST. Of this 1,528,000 kw were steam plant capacity; 670,884 kw hydro; and 14,618 kw diesel engine. For 1955 are planned 2,107,100 kw; 1956, 1,412,700 kw.

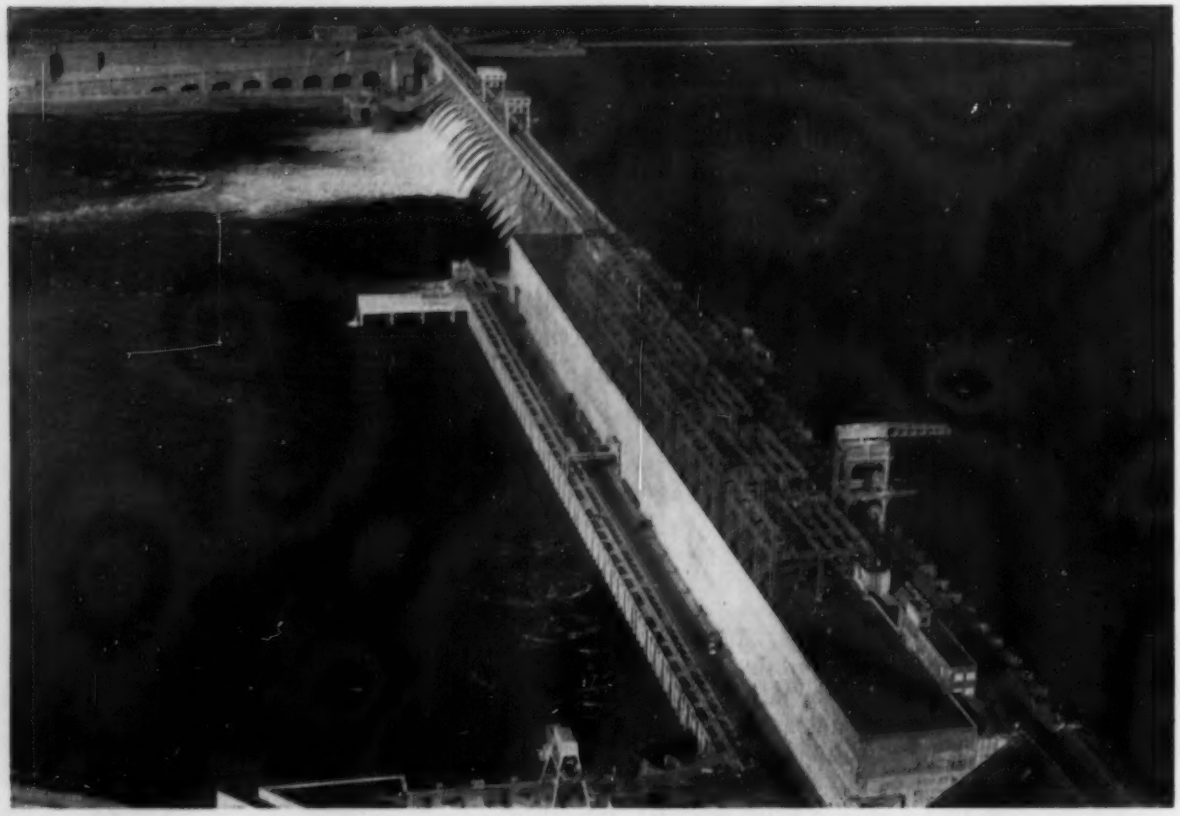
Expenditures Western utility systems, exclusive of federal, spent $523,032,200 as compared with a budget of $518,065,077 reported a year ago. For fiscal 1954-55, federal agencies—USBR, Army Engineers and BPA—had an additional $181,101,040 to spend. Combined budget for all agencies is thus $650,959,250.

Construction Engineering awards for construction in the West were $2,198,726,000 in 1954. This compares with $2,059,720,000 for 1953. These figures indicate that although 1954 showed a slackening in many lines of business there was an increase of $139,006,000 in construction awards. No curtailment in heavy construction is expected in 1955. Based on figures for the 11 Western states compiled by the Bureau of Labor statistics for the first nine months of 1954, permits will be issued for 270,000 dwelling units valued at $2,280,000,000 for the full year. For 1955 a 10% increase is estimated or 297,000 units with valuation of $2,508,000,000.

Budgets Budgeted for 1955 by nonfederal power agencies of the West are $470,021,250. This is down 8.7% from the $523,032,200 spent in 1954. Federal agencies have budgeted for fiscal 1955-56 another $180,939,000, practically the same as was authorized for the previous fiscal year. Combined budget for nonfederal agencies for 1955 as compared to capital expenditures for 1954 is down this 8.7% because of several large generating plants being built in 1954 that do not have a counterpart in 1955. With the exception of a few of the larger utilities, who completed large plants, the majority of Western utilities will spend more this year than in 1954. This applies particularly to expenditure for distribution system expansion.

Appliances The factors that turned 1954 into a good appliance year after a very slow start should continue to operate during 1955. High incomes, a booming home-building market and a huge replacement reservoir augur well for the appliance industry here in the West. Here are the 1954 sales totals for the region: ranges, 182,000; refrigerators, 485,000; water heaters, 76,000; washers, 622,500; dryers, 128,500; freezers, 111,500; TV sets, 639,000. There are 6,554,375 residential and rural customers in the region, which is about 14.5% of the U. S. total. However Western customers fall into high-use brackets. Ten utility systems report average annual residential consumptions of more than 6,000 kwh; almost all equal or exceed the national average. Of special note for 1955 are the intensified sales programs of several utilities that have held back in the past. Ample power supplies plus intensified competition account for the "new look" in cooperative selling.

Customers Western utilities served a total of 7,596,949 customers as of Nov. 30, 1954. This compares with a total at the close of 1953 of 7,315,645 or a gain of 3.84%. The state totals for the 11-month period of 1954 were: Arizona, 253,653; California, 4,407,621; Colorado, 487,834; Idaho, 210,333; Montana, 205,252; Nevada, 70,977; New Mexico, 201,733; Oregon, 563,507; Utah, 222,742; Washington, 871,942; Wyoming, 101,355.



McNary is one of three power plants in the million-kilowatt class being built on the Columbia River by the Corps of Army Engineers

Outlook Is Healthy for

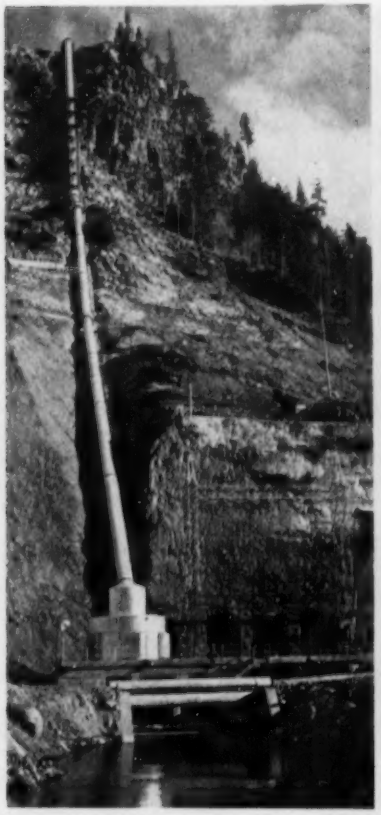
Vermilion Dam, a major project completed by Southern California Edison Co. during 1954

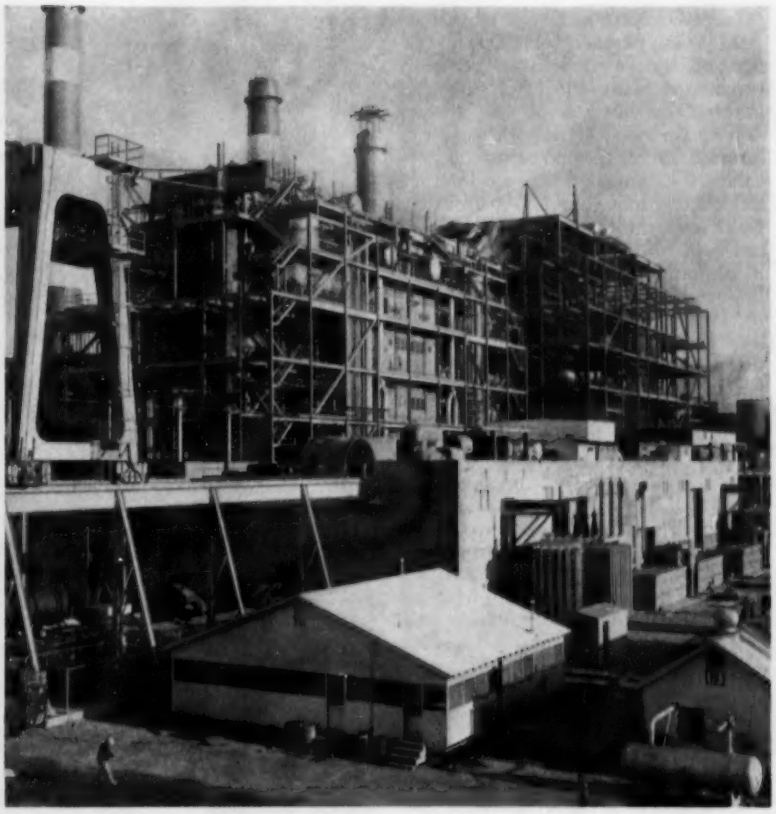
Combined Western system Steam plant construction

All indices and predictions point to an upturn nationally in all lines of business in 1955. Outlook for the electrical industry in the 11 Western states is no exception despite the fact that combined budgets for capital expenditures are down 8.7% from the $713,000,000 (including federal) spent in 1954.

As might be expected with so many large generating plants being built, yearly capital expenditures have begun to cycle, reflecting the completion of large plants in one year and the skipping of a year before the next large plant is charged to capital.

This is illustrated by figures for Pacific Gas and Electric Co. In 1954, $129,000,000 were spent and only





Clearwater No. 2 plant (left), California Oregon Power Co. Right: New 512,000-kw Valley steam plant of Los Angeles Dept. of W&P

Western Utilities in '55

peak is up 10.3% for 1954. hits low cycle in 1955

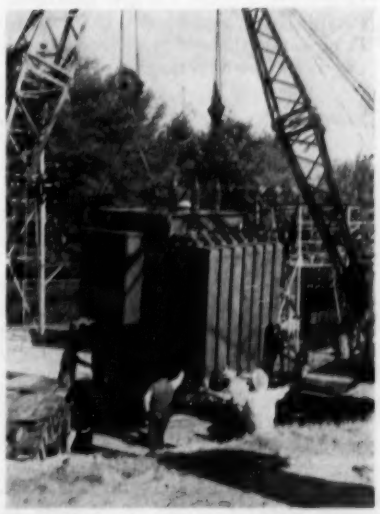
$91,000,000 are budgeted for this year. This reflects completion of the Pittsburg 600,000-kw steam plant in 1954 with no comparable plant scheduled for this year. This reduction of $36,000,000 for PG and E alone accounts for more than half the reduction in budgets to $651,000,000 for 1955 as compared with $713,000,000 spent in 1954.

Other notable drops for the same reason are $24,000,000 to $14,000,000 for San Diego Gas & Electric Co., $22,000,000 to $12,000,000 for Arizona Public Service, $7,500,000 to $3,600,000 for Montana Power, $8,000,000 to $2,200,000 for Public Service Co. of New Mexico and $8,400,000 to $2,800,000 for Hawaiian Electric Co. In all these instances large plants were completed in 1954 and nothing comparable will be under construction in 1955.

These combined reductions were not entirely offset by aggregate budget increases for 1955 by the majority of Western utilities. The result is that total budget for nonfederal agencies is $470,021,250 as compared with expenditure of $523,032,200 for 1954. Federal allotments are $180,939,000 compared with $181,101,040 for 1954.

The Combined Annual Peak for Western systems of 18,761,000 kw for 1954, up 10.3% over the 17,005,000-kw peak of the year before, is ample proof of the healthy condition of the utility business in the Far West.

New Generation added during 1954 was 2,213,502 kw. Scheduled for 1955 is a total of 2,107,100 kw. This is the second year that new generation has



Another new substation, Seattle City Light

exceeded 2,000,000 kw and, with 2,107,000 kw planned for 1955, no section of the West is even remotely threatened with future shortage of power. The calendar of new generation on pp 80-81 contains a wealth of information on new plant capacity.

New Transmission planned for 1955 totals 2,614 miles, up 17.5% from the 2,227 miles built last year. Of this, 267 miles will be built by the Bureau of Reclamation and 364 miles by the Bonneville Power Administration. Of the latter, much of the mileage will be for 345-kv operation.

Distribution Line Mileage planned for 1955 is 6,924, up 9.5% from the 6,329 miles built in 1954.

Transmission Substation Capacity to be added in 1955 will drop to 3,755,410 kva, down 33% from 5,576,756 kva added last year. This again is a reflection of the low cycle in large generating plant construction during 1955.

Distribution Substation Capacity, on the other hand, reflects the time delay in new generating capacity being provided for in the distribution system. According to utility reports there is planned, for 1955, 2,535,141 kva of new capacity. This is 51% greater than the 1,687,826 kva built in 1954.

In the pages that follow will be found statements by federal and nonfederal agencies reviewing major construction completed during 1954 and that planned for 1955. These reports give a most encouraging outlook for 1955.

Completed De-Moss Petrie steam station of the Tucson Gas, Electric Light & Power Co.

Federal

Army Engineers

The many large multipurpose power projects now under construction in the Pacific Northwest by the U. S. Army Engineers will be found listed under the states in which they are located.

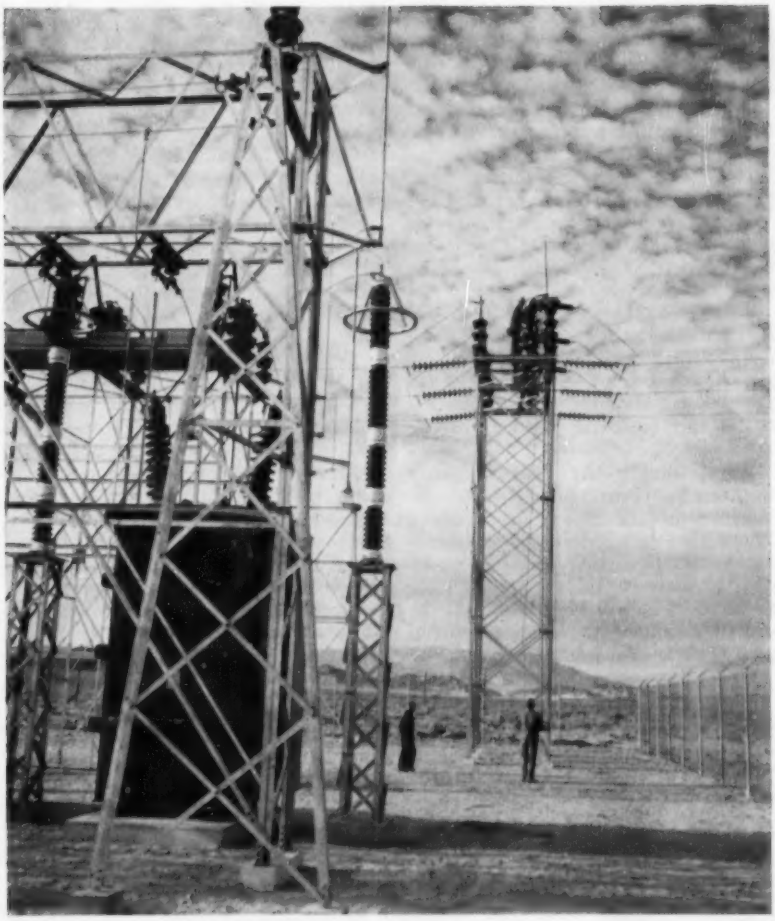
Bonneville

Report of the Bonneville Power Administration is on p 96.

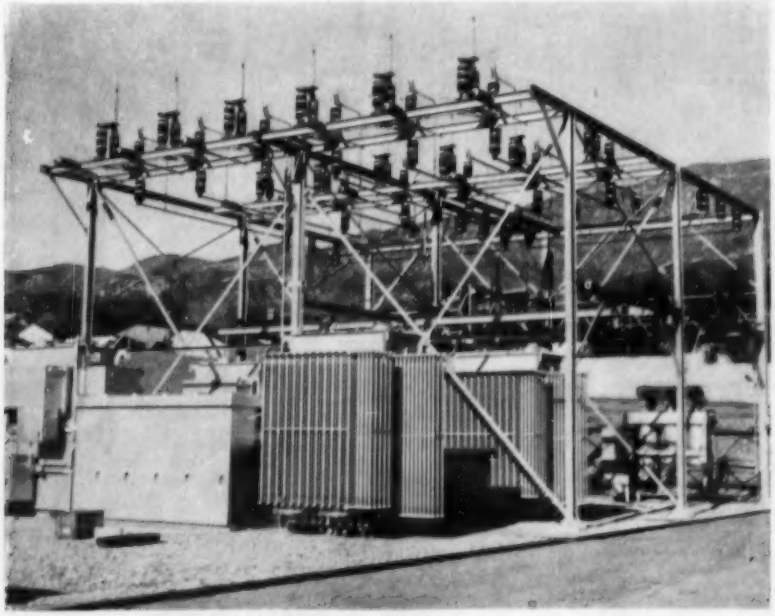
REA

REA approved more than $15,000,000 in rural electrification loans to borrowers in the Western area during 1954. Loans were distributed among states as follows: Arizona, $1,439,000; California, $809,000; Colorado, $3,823,000; Idaho, $220,000; Montana, $2,418,000; New Mexico, $1,599,000; Oregon, $1,265,000; Washington, $2,289,930; Wyoming, $1,213,000. No loans were approved in Nevada or Utah.

Copper Cities 110-kv substation near Miami, Ariz., built by Salt River Power District



Substation erected by California Electric Power Co. gives Baker, Calif., first service



New York substation was part of expansion program of Glendale Public Service Dept.

REA estimates that the loans will enable the borrowers to build 3,655 miles of new line and to serve 10,500 new rural consumers.

Since the REA program was established in 1935, loans in the amount of about $328,600,000 have been approved to borrowers in the Western states. In December 1954 they were serving nearly 300,000 consumers from about 122,000 miles of line.

The Western REA-financed systems, like others throughout the country, now are engaged chiefly in the work of making system improvements to meet growing demands. Nationally, use of power on REA-financed systems increased about 14% in 1954.

REA estimates show that about 94% of the farms in the 11 Western states were electrified on July 1, 1954. The percentage of electrified farms in the individual states is as follows: Arizona, 92.7%; California, 94.7%; Colorado, 93.8%; Idaho, 97.7%; Montana, 87.8%; Nevada, 68.4%; New Mexico, 74.5%; Oregon, 98.4%; Utah, 98.1%; Washington, 99.1%; and Wyoming, 90.2%.

Tabulations showing status of REA borrowers are on pp 82-83. REA operations are shown on p 96.

Bureau of Reclamation

Reports on status of Western USBR projects will be found listed under the states in which they are located. A table will be found on p 102 showing current and future bureau projects. The comprehensive transmission line construction program of USBR will be found on p 103.

Arizona

Arizona Public Service

Arizona Public Service Co.'s construction expenditures for additional facilities added during 1954 amounted to approximately $22,250,000, the largest item of expenditure being in the production facilities at the new Saguaro steam power plant amounting to approximately $14,000,000. For 1955 it is estimated construction will amount to $12,107,000. This is considerably below 1954 and is accounted for by the completion of the program covering installation of two 100-mw generating units at Saguaro. The plant will be completed early this year—the unit going into commercial operation some time during the second quarter. The first unit went on the line on July 1, 1954. The plant is so designed that two more units may be added but

there are no immediate plans for further additions.

Public Service's load reached a 319-mw peak in 1954, which is approximately 6% over 1953, and is down somewhat compared with the 50-year trend of 12½%. This lower increase is partially accounted for by lower overall system losses, there being approximately 40,000 kvar of static capacitors added, some rearrangements for increase and size of lines, delivery of power from additional terminals on the USBR Arizona transmission system and general system improvements.

The peak load is estimated to approach 375 mw during 1955. Transmission line mileage to be added amounts to 87 miles, which is slightly less than the amount added during 1954. Distribution line mileage for 1955 is estimated at 61 miles, while during 1954 there were 187 miles built. About the same kva of substation capacity will be added both in transmission substations and distribution substations, which during 1954 was 140 kva and 104 kva, respectively.

There was a slight improvement in load factor last year and another noticeable item is the amount of three-phase construction necessary for residential air conditioning. The majority of the new subdivisions are planned for refrigeration air conditioning and because of the high ambient temperatures in our area larger units become necessary, which require three phase. We have found it advisable to provide three-phase service with the initial construction of electrical service to serve these subdivisions.

During 1954 two major transmission terminal substation facilities were installed at Yuma and Bouse. These new substations are of 20,000 kva capacity each, stepping down from 161 to 69 and 12 kv respectively in the areas served.

Also, during the year the first major underground facilities were installed in the downtown area of Phoenix to provide additional distribution feeder capacity on the 12.5-kv distribution system. During 1955 additional feeders will be added and the system extended to cover additional area. This is all a part of a long-range program for underground system in the Phoenix downtown area. Originally the Phoenix downtown area was served with 2,300/4,160-v feeders, which are still being used with the area being narrowed down from year to year. The ultimate program is to eliminate completely this voltage, which is the last part of the company's program started some 15 years ago of converting from this lower voltage to the 12.5-kv distribution level. The general program of converting outside of the downtown area will be completed during 1955.

Another major project started late in 1954 was 55 miles of new 69-kv transmission line from the town of Williams to the south rim of the Grand Canyon. This will provide public utility service to the Fred Harvey system and the Grand Canyon National Park recreation area for the first time. At present the canyon receives power from an isolated plant operated by the Fred Harvey system in conjunction with the steam heating plant. This additional power supply available and shutting down the isolated plant per-

Calendar of New Generation

(1953 installations have been dropped and 1960 added)

1954—Completed

Date	Size—Kw	Plant	Agency
Jan.	31,500 (H)	Flatiron	USBR
Jan.	33,250 (H)	Pole Hill	USBR
Jan.	90,000 (H)	Ross	Seattle Lighting Dept.
March	3,800 (H)	Murphys	PG and E
March	16,667 (H)	Canyon Ferry	USBR
April	70,000 (H)	McNary	Army Eng.
April	16,667 (H)	Canyon Ferry	USBR
Spring	15,000 (S)	George Birdsall	Colo. Springs PU Dept.
May	8,500 (H)	Flatiron	USBR
May	31,500 (H)	Flatiron	USBR
May	66,000 (S)	Kyrene	Salt River Power Dist.
June	18,000 (H)	Big Cliff	Army Eng.
June	66,000 (S)	Zuni	PS of Colorado
June	70,000 (H)	McNary	Army Eng.
July	45,000 (H)	Bridge River	B.C. Elec.
July	100,000 (S)	Saguaro	Arizona PS
Aug.	50,000 (S)	DeMoss Petrie	Tucson GL & P
Aug.	150,000 (S)	Pittsburg	PG and E
Sept.	100,000 (S)	Valley	L.A. Dept. of W&P
Sept.	150,000 (S)	Pittsburg	PG and E
Sept.	70,000 (H)	McNary	Army Eng.
Oct.	160,000 (S)	Redondo	So. Calif. Edison
Oct.	30,000 (S)	Person	PS of N.M.
Nov.	66,000 (S)	Carbon	Utah P&L
Nov.	100,000 (S)	Encina	San Diego G&E
Nov.	56,000 (H)	Kerr	Montana Power
Dec.	300,000 (S)	Pittsburg	PG and E
Dec.	70,000 (H)	McNary	Army Eng.
Dec.	25,000 (S)	Tacoma Plant 2	Tacoma PU Dept.
Dec.	50,000 (S)	Honolulu	Hawaiian Elec.
Dec.	100,000 (S)	Valley	L.A. Dept. of W&P
Dec.	40,000 (H)	Lookout Point	Army Eng.
	650 (E)	Kodiak, Alaska	Kodiak Elec. Assn.
	9,000 (E)	Lovington, N.M.	Lea County Elec. Assn.
	4,668 (E)	Altamont, Utah	Moon Lake Elec. Assn.
	300 (E)	Richfield, Utah	Gar Kane Power Assn.
Total	**2,213,502 kw**	**(S) 1,528,000 kw**	**(H) 670,884 kw (E) 14,618 kw**

1955—Planned

Date	Size—Kw	Plant	Agency
Jan.	15,000 (H)	Eklutna, Alaska	USBR
Jan.	40,000 (S)	Broadway	Pasadena L&P Dept.
Feb.	15,000 (H)	Eklutna, Alaska	USBR
Feb.	70,000 (H)	McNary	Army Eng.
March	6,750 (H)	Nimbus	USBR
April	40,000 (H)	Lookout Point	Army Eng.
April	15,000 (H)	Dexter	Army Eng.
April	14,200 (H)	Alberni Falls	Army Eng.
April	36,000 (H)	Alcova	USBR
April	54,000 (H)	Folsom	USBR
May	70,000 (H)	McNary	Army Eng.

1955—Planned—Continued

Date	Size—Kw	Plant	Agency
May	14,200 (H)	Alberni Falls	Army Eng.
May	100,000 (S)	Saguaro	Arizona PS
May	6,750 (H)	Nimbus	USBR
June	100,000 (S)	Gadsby	Utah P&L
June	156,250 (S)	Valley	L.A. Dept. of W&P
June	40,000 (H)	Lookout Point	Army Eng.
Summer	150,000 (S)	Morro Bay	PG and E
Summer	84,000 (H)	Pit No. 4	PG and E
July	160,000 (S)	El Segundo	So. Calif. Edison
July	54,000 (H)	Folsom	USBR
Aug.	70,000 (H)	McNary	Army Eng.
Sept.	16,500 (S)	W. N. Clark	So. Colo. Power
Sept.	14,200 (H)	Alberni Falls	Army Eng.
Sept.	192,000 (H)	Chief Joseph	Army Eng.
Sept.	6,000 (H)	Chandler	USBR
Fall	100,000 (S)	Arapahoe	PS of Colorado
Oct.	44,000 (S)	Highgrove	Calif. Elec. Power
Oct.	70,000 (H)	McNary	Army Eng.
Oct.	54,000 (H)	Folsom	USBR
Nov.	6,000 (H)	Chandler	USBR
Dec.	64,000 (H)	Chief Joseph	Army Eng.
Dec.	29,000 (H)	Lemolo No. 1	Calif. Oregon Power
Dec.	44,000 (S)	Clark	So. Nevada Power
Dec.	156,250 (S)	Valley	L.A. Dept. of W&P
Total	**2,107,100 kw**	**(S) 1,027,000 kw**	**(H) 1,080,100 kw**

1956—Planned

Date	Size—Kw	Plant	Agency
Jan.	70,000 (H)	McNary	Army Eng.
March	64,000 (H)	Chief Joseph	Army Eng.
April	70,000 (H)	McNary	Army Eng.
June	64,000 (H)	Chief Joseph	Army Eng.
Summer	150,000 (S)	Morro Bay	PG and E
Aug.	3,200 (H)	Pleasant Valley	L.A. Dept. of W&P
Sept.	160,000 (S)	El Segundo	So. Calif. Edison
Sept.	100,000 (S)	Encina	San Diego G&E
Sept.	70,000 (H)	McNary	Army Eng.
Sept.	64,000 (H)	Chief Joseph	Army Eng.
Autumn	50,000 (S)	Humbolt Bay	PG and E
Nov.	10,000 (H)	Portal	So. Calif. Edison
Nov.	160,000 (S)	Alamitos	So. Calif. Edison
Dec.	28,500 (H)	Palisades	USBR
Dec.	90,000 (H)	Ross	Seattle Lighting Dept.
Dec.	33,000 (H)	Lemolo No. 2	Calif. Oregon Power
Dec.	40,000 (S)	Broadway	Pasadena L&P Dept.
Dec.	70,000 (H)	McNary	Army Eng.
Dec.	64,000 (H)	Chief Joseph	Army Eng.
Winter	10,000 (S)	Western Colorado	PS of Colorado
	42,000 (H)	Seton Creek	B.C. Elec.
Total	**1,412,700 kw**	**(S) 670,000 kw**	**(H) 742,700 kw**

mits an expansion and improvement program to be inaugurated by the Fred Harvey system for more and better facilities at the Grand Canyon. Also along the route of the line entering the area, numerous customers and isolated areas not formerly served with electricity will now be able to obtain service.—*George H. Groh, vice-president.*

Salt River Power District

The 66,000-kw Kyrene No. 2 unit was completed and placed in operation as scheduled in May, thereby increasing the plant rating of this station to 99,000 kw. Studies are now being made to determine the optimum location for additional generating capacity with present plans calling for a 100,000-kw outdoor-type unit to be placed in operation in June 1957.

Transmission construction during the year included installation of four new substations, enlargement of several other substations, installation of wave traps at various points and replacement of outmoded oil circuit breakers. Distribution construction included the addition of 22,000 kvar of corrective capacitors, with an additional 10,000 kvar scheduled for 1955.

The conversion of Mormon Flat Dam hydro station from manual to remote semiautomatic operation has been completed and plans for the conversion of the 30,000-kw hydro station at Horse Mesa Dam have been initiated. Both the stations will be operated from Mesa, with local manual operation necessary only under emergency conditions.

Deep sea diving techniques were employed at Horse Mesa Dam last fall as an alternative to releasing the stored water contrary with desired operating schedules. A diver was lowered 200 ft below the surface to make an inspection of the intake screens and surroundings. Subsequently, the water depth at the intake was lowered to 150 ft, a bulkhead was lowered over the intakes, and necessary repairs to tunnel gates, screens and penstocks were made.

Other activities during 1954 included the completion of a new garage to service the project's 500-odd vehicles and the construction of six residences for operating personnel at Roosevelt Dam hydro station.

Construction of a new administration building, to replace the outmoded buildings that are in use at the present time, has been scheduled for 1955, with $860,000 budgeted. Plans are also being made to replace the division line office and warehouse that were destroyed by fire during the fall of 1954.—*T. M. Morong, chief engineer.*

California

Burbank PS Dept.

No major additions occurred to the electric system during 1954. Engineering is practically completed for a new 20,000-kva distributing station and construction is expected to start early in 1955. Major equipment has been purchased for this station. Additions

Calendar of New Generation—Continued

1957—Planned

Date	Size—Kw	Plant	Agency
Jan.	33,000 (H)	Pilot Knob	Imperial Irrig. Dist.
March	64,000 (H)	Chief Joseph	Army Eng.
March	28,500 (H)	Palisades	USBR
Apr.-July	151,000 (H)	Ox Bow	Idaho Power
Spring	60,000 (S)	Clark	So. Nevada Power
June	28,500 (H)	Palisades	USBR
June	1,400 (H)	Wanship	USBR
June	100,000 (S)	(Unnamed)	Salt River Power Dist.
June	64,000 (H)	Chief Joseph	Army Eng.
June	100,000 (S)	Ocotillo	Arizona PS
Summer	22,000 (S)	George Birdsall	Colo. Springs PU Dept.
Summer	100,000 (S)	(Denver area)	PS of Colorado
July	4,000 (H)	Gateway	USBR
Sept.	64,000 (H)	Chief Joseph	Army Eng.
Sept.	28,500 (H)	Palisades	USBR
Oct.	90,000 (H)	Brownlee	Idaho Power
Fall	60,000 (S)	(Unnamed)	Calif. Elec. Power
Oct.	156,250 (S)	Scattergood	L.A. Dept. of W&P
Nov.	104,500 (H)	Hoover N8	USBR
Nov.	156,000 (H)	The Dalles	Army Eng.
Dec.	64,000 (H)	Chief Joseph	Army Eng.
	33,000 (S)	Person	PS of N.M.
	70,000 (H)	Cheakamus	B.C. Elec.
Total	**1,582,650 kw**	**(S) 571,250 kw**	**(H) 1,011,400 kw**

1958—Planned

Date	Size—Kw	Plant	Agency
Jan.	40,000 (H)	Mayfield	Tacoma PU Dept.
Jan.-Oct.	272,000 (H)	Hells Canyon	Idaho Power
Feb.	78,000 (H)	The Dalles	Army Eng.
Feb.-Aug.	270,000 (H)	Brownlee	Idaho Power
March	40,000 (H)	Mayfield	Tacoma PU Dept.
March	64,000 (H)	Chief Joseph	Army Eng.
April	2,000 (H)	Tiber	USBR
Spring	50,000 (S)	Honolulu	Hawaiian Elec.
Spring	77,500 (H)	Wenatchee	Chelan PUD
May	40,000 (H)	Mayfield	Tacoma PU Dept.
May	78,000 (H)	The Dalles	Army Eng.
June	4,500 (H)	Big Thompson	USBR
June	33,000 (S)	(Unnamed)	So. Colo. Power
June	64,000 (H)	Chief Joseph	Army Eng.
Summer	106,000 (H)	Poe	PG and E
Aug.	5,625 (H)	Roza	USBR
Aug.	78,000 (H)	The Dalles	Army Eng.
Sept.	64,000 (H)	Chief Joseph	Army Eng.
Fall	20,000 (S)	Burbank No. 5	Burbank PS Dept.
Fall	70,000 (H)	Cheakamus	B.C. Elec.
Nov.	78,000 (H)	The Dalles	Army Eng.
Dec.	47,000 (H)	Gorge	Seattle Lighting Dept.
Dec.	64,000 (H)	Chief Joseph	Army Eng.
Dec.	67,500 (H)	Wenatchee	Chelan PUD
Winter	100,000 (S)	(Unnamed)	Utah P&L
	40,000 (S)	Glendale	Glendale PS Dept.
Total	**1,853,125 kw**	**(S) 243,000 kw**	**(H) 1,610,125 kw**

1959—Planned

Date	Size—Kw	Plant	Agency
Jan.	40,000 (H)	Mayfield	Tacoma PU Dept.
Feb.	78,000 (H)	The Dalles	Army Eng.
March	75,000 (H)	Mossyrock	Tacoma PU Dept.
May	75,000 (H)	Mossyrock	Tacoma PU Dept.
May	78,000 (H)	The Dalles	Army Eng.
July	75,000 (H)	Mossyrock	Tacoma PU Dept.
June	5,500 (H)	Molina	USBR
Summer	100,000 (S)	Denver area	PS of Colorado
Aug.	100,000 (S)	(Unnamed)	San Diego G&E
Aug.	78,000 (H)	The Dalles	Army Eng.
Nov.	78,000 (H)	The Dalles	Army Eng.
	30,000 (H)	American Falls	USBR
	44,000 (S)	(Unnamed)	PS of N.M.
Total	**856,500 kw**	**(S) 244,000 kw**	**(H) 612,500 kw**

1960—Planned

Date	Size—Kw	Plant	Agency
Jan.	75,000 (H)	Mossyrock	Tacoma PU Dept.
Feb.	78,000 (H)	The Dalles	Army Eng.
May	78,000 (H)	The Dalles	Army Eng.
May	24,000 (H)	Glendo	USBR
May	50,000 (H)	Yellowtail	USBR
June	2,500 (H)	Cameo	USBR
Summer	60,000 (S)	Clark	So. Nevada Power
Aug.	50,000 (H)	Yellowtail	USBR
Aug.	78,000 (H)	The Dalles	Army Eng.
Nov.	50,000 (H)	Yellowtail	USBR
Nov.	78,000 (H)	The Dalles	Army Eng.
Total	**623,500 kw**	**(S) 60,000 kw**	**(H) 563,500 kw**

TENTATIVELY PLANNED OR UNDER INVESTIGATION

Date	Size—Kw	Plant	Agency
After 1957	450,000 (H)	McCloud or Klamath	Calif. Oregon Power
1959-60	385,000 (H)	Noxon	Washington Water Power
	85,000 (H)	Baker	Puget Sound P&L
	600,000 (H)	Wells	Puget Sound P&L
	1,200,000 (H)*	Mica	Puget Sound P&L
	35,000 (H)	Bear Marsh	Eugene Water Board
	244,000 (H)	Bruces Eddy	Pacific N.W. Power Co.
	850,000 (H)	Mountain Sheep & Pleasant Valley	Pacific N.W. Power Co.
	1,000,000 (H)†	John Day	Pacific N.W. Power Co.
Total	**4,849,000 kw**		

(H) Hydro (S) Steam (E) Engine
*From storage
†Approx.

to the 34.5-kv overhead system will be made in connection with the construction of the station. System peak for 1954 has been 64,800 kw to date and is expected to go to 65,500, which corresponds to a 2.7% increase over the previous year. The kilowatt-hours for the year are expected to be approximately 333,000,000, which corresponds to a 2% increase over 1953.

Expenditures in capital improvements were $1,250,000 for this year and the amount budgeted for 1955 is $1,080,000. An area consisting of 429 residences was annexed by the city during the year. There was a net increase of 967 meters added to the system, exclusive of the annexation. Engineering was nearly completed on a city-wide alarm system. The work of installation for the fire department will be done by this department's forces. Estimated cost of this system is $140,000.—*A. E. Capon, principal utilities engineer.*

California Electric Power

Construction work carried out at fuel-electric generating plants in 1954 consisted of progress on the installation of the 44,000-kw No. 4 generating unit at Highgrove steam plant. The unit is scheduled to be placed in service in the fall of 1955.

Work at hydroelectric generating plants included improvements to storage dams and related works, miscellaneous building additions and alterations, and miscellaneous improvements to electrical and hydraulic auxiliary equipment.

The 1954 transmission expenditures have related to the expansion of generating and transmission facilities originating at the Highgrove steam plant and conversion of the transmission system to 115-kv operation. The conversion to 115-kv operation is scheduled for completion in the late fall of 1955.

Principal items included in this dual category have included the construction of a short length of transmission line to provide a second source of power to a main line substation; rebuilding, reconductoring and reinsulation of an existing transmission line to increase its capacity and provide for 115-kv operation; relocation and strengthening of a section of main transmission line subject in its present location to severe icing during winter months; replacement and modernization of oil circuit breakers to increase their operating speed; installation of an oscillograph at each of two main line substations; addition to magnesium anodes at selected locations in a transmission line; rebuilding and relocation of a main line substation, with increased capacity, to clear a state

Status of Western REA-Financed Systems

Borrower	Cumulative Construction Loans 12-31-54	1954 Construction Loans	Miles Energized 12-1-54	Consumers Connected 12-1-54
ARIZONA	**$20,454,723**	**$1,439,000**	**4,285**	**12,077**
Navopache Electric Co-op., Lakeside	3,248,000	...	680	2,672
Sulphur Springs Valley Electric Co-op., Willcox	5,977,828	...	1,414‡	3,880‡
Littlefield Electric Co-op., Littlefield	20,000	...	14‡	22‡
Graham County Electric Co-op., Pima	3,130,672	...	606	2,333
Trico Electric Co-op., Tucson	4,348,368	37,000	620	880
Verde Electric Co-op., Cottonwood	558,569	...	188‡	410‡
Mohave Electric Co-op., Kingman	829,000	52,000	275	478
Duncan Valley Electric Co-op., Duncan	750,000	...	255	871
Stonewall Electric Co., Tucson	100,000§	...	116‡	200‡
San Carlos Irrig. & Drainage Dist., Coolidge	142,286§	...	117‡	331‡
Wellton-Mohawk Irrig. & Drainage Dist., Wellton	1,350,000	1,350,000	...†	...†
CALIFORNIA	**$15,661,178**	**$ 809,000**	**3,069**	**31,674**
Imperial Irrigation Dist., Imperial	700,000§	...	800‡	4,100‡
Surprise Valley Electrification Corp., Alturas	2,391,500	...	973‡	2,093‡
Plumas-Sierra Rural Elec. Co-op., Portola	1,492,000	...	500	1,441
Mountain Empire Elec. Co-op., Campo	822,000	...	220	1,246
Sacramento MUD*, Sacramento	9,394,000	809,000	573‡	22,714‡
Anza Elec. Co-op., Anza	750,000	...†	...†	...†
Mesa Elec. Co-op., Phelan	67,829§	...§	...§	...§
Klamath River Elec. Co-op., Hornbrook	43,849§	...	3‡	80‡
COLORADO	**$65,591,741**	**$3,823,000**	**28,711**	**65,674**
Grand Valley Rural Power Lines, Grand Junction	1,729,000	185,000	695	3,145
San Luis Valley Rural Elec. Co-op., Monte Vista	3,284,000	...	1,224	3,087
Morgan County Rural Elec. Assn., Fort Morgan	3,896,000	...	1,943‡	3,889‡
Intermountain Rural Elec. Assn., Littleton	5,319,500	1,350,000	2,046	5,850
Southeast Colorado Power Assn., La Junta	8,518,234	...	4,970	6,451
Gunnison County Elec. Assn., Crested Butte	789,166	...	305	476
Delta Montrose Rural Power Lines Assn., Delta	1,294,000	...	757‡	2,230‡
Union Rural Elec. Assn., Brighton	2,237,000	...	941	3,186
San Isabel Elec. Assn., Pueblo	1,430,000	360,000	653	1,179
San Miguel Power Assn., Nucla	1,391,000	285,000	333	1,423
Highline Elec. Assn., Holyoke	4,186,511	435,000	2,492	3,977
Poudre Valley Rural Elec. Assn., Fort Collins	2,483,000	130,000	1,216	3,285
La Plata Elec. Assn., Durango	1,809,000	...	663	2,018
Empire Elec. Assn., Cortez	2,400,448	...	782	3,912
Holy Cross Elec. Assn., Glenwood Springs	1,560,000	...	533‡	2,080‡
Sangre De Cristo Elec. Assn., Salida	1,222,000	...	455	1,164
Yampa Valley Elec. Assn., Steamboat Springs	4,861,000	965,000	1,103	4,069
Mountain View Elec. Assn., Limon	4,850,500	...	2,744	4,167
Y-W Elec. Assn., Akron	3,833,747	...	2,013	3,484
K. C. Elec. Assn., Hugo	4,295,000	...	1,958	3,412
White River Elec. Assn., Meeker	1,490,894	...	200	894
Mountain Parks Elec., Walden	2,470,000	...	600	1,950
Monument Elec. Co.,** Trinidad	241,741	113,000	85	346
IDAHO	**$15,305,795**	**$ 220,000**	**6,387**	**15,000**
Northern Lights Inc., Sandpoint	2,939,750	...	1,158	2,865
Clearwater Valley L & P Assn., Lewiston	3,857,000	...	1,927	4,218
Kootenai Rural Elec. Assn., Coeur d'Alene	1,211,000	...	693	2,223
Idaho County L & P Co-op. Assn., Grangeville	1,153,500	...	615	1,189
Raft River Rural Elec. Co-op., Malta	1,412,500	220,000	441	687
Fall River Rural Elec. Co-op., Ashton	1,435,000	...	582‡	1,627‡
Lost River Elec. Co-op., Mackay	1,327,000	...	259	895
Prairie Power Co-op., Fairfield	424,000	...	234	230
Salmon River Elec. Co-op., Challis	1,350,000	...	313	646
Long Valley Power Co-op., Donnelly	196,045§	...	165‡	420‡
MONTANA	**$46,993,051**	**$2,418,000**	**25,270**	**28,569**
Ravalli County Elec. Co-op., Corvallis	871,700	...	378	942
Sun River Elec. Co-op., Fairfield	2,419,500	415,000	1,817	2,335
Lower Yellowstone Valley Elec. Co-op., Sidney	1,861,600	...	1,059	1,513
Yellowstone Valley Elec. Co-op., Huntley	1,675,498	...	965	2,356
Vigilante Elec. Co-op., Dillon	2,673,000	440,000	1,300	1,950
Missoula Elec. Co-op., Missoula	1,585,000	450,000	573	1,191
Flathead Elec. Co-op., Kalispell	2,745,000	...	715	2,629
Fergus Elec. Co-op., Lewistown	3,091,354	...	2,155	2,623
Park Elec. Co-op., Livingston	1,250,000	...	677	1,218
Mid-Yellowstone Elec. Co-op., Hysham	745,000	185,000	380	723
Beartooth Elec. Co-op., Red Lodge	1,292,000	...	981	1,690
Big Horn County Elec. Co-op., Lodge Grass	1,587,000	...	714	1,299
Big Flat Elec. Co-op., Malta	1,599,000	280,000	815	804
Sheridan County Elec. Co-op., Medicine Lake	2,715,000	75,000	1,853‡	2,004‡
Northern Elec. Co-op., Opheim	1,918,000	108,000	1,007	1,039
Valley County Elec. Co-op., Glasgow	935,000	...	592	765
McCone County Elec. Co-op., Circle	3,752,399	...	2,039	2,495
Goldenwest Elec. Co-op., Wibaux	1,139,000	...	730	737
Glacier County Elec. Co-op., Cut Bank	2,886,000	...	863	2,879
Marias River Elec. Co-op., Shelby	1,911,000	...	958	2,442
Hill County Elec. Co-op., Havre	3,335,000	...	2,354	1,749
Tongue River Elec. Co-op., Ashland	2,043,000	465,000	935	937
Southeast Elec. Co-op., Ekalaka	1,633,000	...	1,092	1,033
Lincoln Elec. Co-op., Eureka	1,110,000	...	269	1,026
Elmo Elec. Co-op. Assn., Proctor	220,000	...	49‡	190‡
NEVADA	**$ 354,000**		**165**	**757**
Alamo Power Dist. No. 3*, Alamo	99,000	...	36	87
Overton Power Dist. No. 5*, Overton	255,000	...	129‡	670‡

Borrower	Cumulative Construction Loans 12-31-54	1954 Construction Loans	Miles Energized 12-1-54	Consumers Connected 12-1-54
NEW MEXICO	**$61,993,499**	**$1,599,000**	**17,837**	**43,088**
Central Valley Elec. Co-op., Artesia	3,801,000	...	1,085	2,883
Roosevelt County Elec. Co-op., Portales	2,762,000	...	1,268	2,601
Farmers' Elec. Co-op., Clovis	3,868,000	30,000	2,452	3,898
Kit Carson Elec. Co-op., Taos	2,572,215	...	712	4,560
Otero County Elec. Co-op., Cloudcroft	2,728,183	...	1,048	2,386
Mora-San Miguel Elec. Co-op., Mora	1,483,000	...	723	2,016
Northern Rio Arriba Elec. Co-op., Chama	908,800	61,000	262	1,015
Sierra Elec. Co-op., Truth or Consequences	598,000	...	257	542
Plains Electric (Generation and Transmission) Co-op., Albuquerque	9,045,000	...	...‖	...‖
Springer Elec. Co-op., Springer	3,097,000	...	1,170	2,085
Socorro Elec. Co-op., Socorro	3,501,400	...	1,217	2,902
Central New Mexico Elec. Co-op., Mountainair	4,403,500	120,000	2,281	3,037
Continental Divide Elec. Co-op., Grants	3,673,000	233,000	682	2,663
Lea County Elec. Co-op., Lovington	10,408,000	1,155,000	1,558	4,853
Columbus Elec. Co-op., Columbus	3,715,000	...	949‡	1,014‡
Southwestern Elec. Co-op., Clayton	1,410,000	...	1,200	833
Jemez Mountains Elec. Co-op., Espanola	3,884,903	...	874	5,311
Stonewall Elec. Co., Albuquerque	134,498	...	119‡	489‡
OREGON	**$33,669,958**	**$1,265,000**	**9,293**	**31,722**
Blachly-Lane County Co-op. Elec. Assn., Eugene	1,302,000	...	308	1,174
Benton-Lincoln Elec. Co-op., Corvallis	5,540,000	...	1,386	4,719
Umatilla Elec. Co-op. Assn., Hermiston	1,443,000	270,000	454	2,158
Douglas Elec. Co-op., Roseburg	2,950,674	...	821	3,782
Lane County Elec. Co-op., Eugene	3,342,426	...	767	4,924
Coos-Curry Elec. Co-op., Coquille	4,192,604	...	718	4,434
Sandy Elec Co-op., Sandy	1,064,000	...	221	878
Tillamook PUD*, Tillamook	425,000	...	75‡	383‡
Central Elec. Co-op., Redmond	1,776,000	...	750	1,716
Wasco Elec. Co-op., The Dalles	2,340,000	...	1,138	1,574
Columbia Basin Elec. Co-op., Heppner	1,665,000	...	759	742
West Oregon Elec. Co-op., Vernonia	2,069,000	...	452	2,462
Eastern Oregon Elec. Co-op., Pendleton	795,000	...	234‡	593‡
Columbia Power Co-op. Assn., Monument	2,234,000	...	627‡	975‡
Midstate Elec. Co-op., Lapine	2,040,000	995,000	214	496
Malheur Co-op. Elec. Assn., Vale	463,670§	...	365‡	621‡
Jordan Valley Elec. Co-op., Jordan Valley	27,584§	...	4‡	91‡
UTAH	**$ 5,890,907**	...	**1,677**	**4,400**
Garkane Power Assn., Richfield	1,629,500	...	497	1,526
Moon Lake Elec. Assn., Altamont	3,827,000	...	1,000	2,496
Escalante Valley Elec. Assn., Beryl	322,800	...	107‡	238‡
Flowell Elec. Assn., Fillmore	34,000	...	30‡	63‡
Dixie Rural Elec. Assn., St. George	63,000	...	30‡	32‡
Beaver Valley Elec. Assn., Beaver City	14,607§	...	13‡	45‡
WASHINGTON	**$35,788,619**	**$2,289,930**	**13,300**	**33,907**
Benton Rural Elec. Assn., Prosser	3,894,500	...	1,098	3,549
Orcas P & L, Eastsound	2,057,600	250,000	319‡	1,553‡
Mutual P & L, North Bend	146,919	...	40	143
PUD No. 1 of Klickitat County*, Goldendale	3,150,000	345,000	906‡	2,493‡
Inland Empire Rural Electrif., Spokane	5,015,710	597,430	3,013	6,122
Columbia County Rural Elec. Assn., Dayton	1,637,000	...	819	1,058
Quinault Light Co., Quinault	763,000	...	34	306
PUD No. 1 of Kittitas County*, Ellensburg	520,500	77,500	236	612
Chelan County Elec. Co-op., Leavenworth	281,000	...	101	429
Okanogan County Elec. Co-op., Winthrop	225,000	...	137	449
Pend Oreille Elec. Co-op., Newport	1,511,000	...	531	1,152
Big Bend Elec. Co-op., Ritzville	3,407,000	...	1,351	1,618
Lincoln Elec. Co-op., Davenport	1,817,000	175,000	1,165	1,133
Nespelem Valley Elec. Co-op., Nespelem	646,000	125,000	227	497
Ferry County PUD No. 1*, Republic	2,440,000	720,000	654‡	1,316‡
PUD No. 1 of Douglas County*, Bridgeport	4,197,000	...	886	4,299
Mason County PUD No. 1*, Shelton	170,000	...	50‡	230‡
PUD No. 1 of Cowlitz County, Longview	201,192§	...	185‡	680‡
PUD No. 1 of Lewis County, Chehalis	467,752§	...	330‡	1,817‡
Stevens County Elec. Co-op., Colville	2,243,996§	...	1,060‡	2,280‡
Molson-Chesaw Elec. Co-op., Molson	315,000	...	...†	...†
PUD No. 1 of Clallam County, Sequim	418,214§	...	75‡	930‡
PUD No. 2 of Grant County, Ephrata	49,280§	...	24‡	743‡
PUD No. 1 of Pend Oreille County, Newport	213,956§	...	59‡	498‡
WYOMING	**$26,875,707**	**$1,213,000**	**12,174**	**30,106**
Riverton Valley Elec. Assn., Riverton	1,575,000	...	957	1,771
Big Horn Rural Elec. Co., Basin	1,525,000	...	756	1,516
Wyrulec Co., Lingle	1,859,600	...	1,072	1,908
Bridger Valley Elec. Assn., Mountain View	1,397,801	240,000	345	776
Wheatland Rural Electrif. Assn., Wheatland	1,241,000	...	832	996
Lower Valley P & L, Freedom	4,206,006	...	380	2,576
Garland L & P, Powell	435,300	60,000	198	498
Washkie Rural Elec. Co., Worland	245,500	73,000	102	266
Rural Elec. Co., Pine Bluffs	3,057,000	...	2,100	2,956
Hot Springs County Rural Elec. Assn., Thermopolis	1,240,000	...	673	896
Carbon P & L, Saratoga	1,897,054	840,000	675	1,347
Niobrara Elec. Assn., Lusk	2,376,000	...	1,363	1,293
Shoshone River Power, Cody	1,365,000	...	316	356
Sheridan-Johnson Rural Elec. Assn., Sheridan	1,485,000	...	674	841
Tri-County Rural Elec. Assn., Sundance	2,891,746	...	1,566	1,882
Sheridan Suburban Elec. Co., Sheridan	78,700§	...	165‡	228‡

†Not energized ‡Estimate §Loan repaid ‖Power-type borrower *Public agency **Commercial company

highway realignment; progressive general reconstruction for conversion of the transmission system to 115-kv operation; routine repoling in selected locations.

Distribution construction, in addition to customer extensions, has included substation transformer capacity totaling 32,000 kva in new substations; 43,000 kva net increase in existing substation capacity; installation of new and modernized oil circuit breakers; construction of new commercial, stores and garage buildings and additions and improvements at existing buildings; repoling and reconductoring on existing distribution lines; addition of capacitors at selected substations and line locations; cutover of existing primaries to 4-kv or 12-kv operation.

1955 Construction Program

During 1955 construction work will be completed in connection with the installation of the 44,000-kw No. 4 generating unit at the Highgrove steam plant, scheduled to be placed in service in the fall of the year.

Engineering will also be undertaken toward the construction of another steam plant presently planned for the fall of 1957.

Work at the hydroelectric generating plants will include replacement of a section of wood-stave flow line at an existing plant; improvements to storage dams, head gates, flumes and related works; rebuilding the indoor bus and switchboard at one plant; replacement of the waterwheel at an existing plant; construction of new cottages, storeroom and garage facilities as well as alterations at existing buildings; miscellaneous improvements to existing hydraulic and electrical auxiliary equipment.

The 1955 transmission expenditures are related to expansion of the generating and transmission facilities originating at the Highgrove steam plant; conversion of the transmission system to 115-kv operation, including provision for increased transformer capacity in the transmission category.

Increase of transmission facilities will include additional line and terminal facilities for line No. 6 originating at the Highgrove steam plant.

Principal transmission items relating to conversion to 115-kv operation will include installation of overhead ground wires; revamping or replacement of station lighting arresters; changing out of transformer capacity at existing substations and installation of new transformers at selected locations. Net increase in transmission substation capacity will approximate 61,000 kva.

Other transmission expenditures will include addition of supervisory control of an existing station; conversion of relaying facilities to high-speed operation; installation to two fixed oscillographs; addition of magnesium anodes at selected station and line locations; routine repoling.

In addition to expenditures for customer extensions the following major work will be undertaken: addition of new distribution substations totaling 4,000 kva; increase of 70,000 kva in transformer capacity at existing substations; installation of new and modernized oil circuit breakers; construction of new operating, stores and garage buildings; improvements and additions at existing buildings; addition of regulators and capacitors at selected stations and line locations; cutover of existing primaries to 4-kv or 12-kv operation; reconstructions, reconductoring and repoling on existing lines.

Principal item in the category of general structures will include initiation of construction of a new general office and industrial center at a location to be determined.—*W. T. Johnson, vice-president and executive engineer.*

Reconstruction work on steel pole transmission line of the Imperial Irrigation District

California-Pacific Utilities

During 1954 our eastern Oregon system was provided with another source of power through a connection to the transmission system of the Bonneville Power Administration at La Grande. A 20-year contract for power obtained from the Bonneville system was signed with the U. S. Department of Interior.

The continued increase in customer use of electricity on our electric properties is substantiated by a 17% increase in the company's system peak demand and 8% increase in electric revenues. This growth, of course, necessitated the addition of new substation capacity in certain areas where spare capacity was no longer available; 1,000 kva of substation capacity were added on the northern Nevada properties and a new 2,500-kva substation was built in the southern California service area.

Additional short wave radio stations and the necessary number of two-way mobile units were added on our eastern Oregon properties to complete the radio communication system on which installation began in 1953. The Rock Creek hydroelectric plant in Baker County, Ore., was also converted to semiautomatic operation.

Construction program for 1955 includes the addition of 220 miles of new distribution lines together with approximately 5,000 kva of distribution substation capacity. A large part of the new distribution line will provide power for numerous irrigation pumping projects on the rural areas of the company's eastern Oregon and northern Nevada properties. Since the job of almost 100% electrification of the rural customers in the company's service areas has been accomplished, rural customers are taking greater advantage of low-cost electric service by continually expanding the number of farm and ranch applications of electricity.

Rapid Growth

A number of new street lighting systems are planned for various communities of the company's service area and two new housing subdivision projects at Henderson on our southern Nevada properties will add more than 1,000 new residence customers. Industrial expansion on this property has been phenomenal as this Nevada city has grown to the third largest city in the state in a few short years. Two new projects of governmental agencies on our Oregon and Nevada properties will also require approximately 1,000 kva of new substation capacity. Other contingent projects over various parts of the company's system indicate that the healthy growth of the use of electric service is likely to continue at the past year's highly satisfactory rate. Construction budget is approximately 10% greater than the expenditure last year.—*E. K. Albert, president.*

Central Valley Project, USBR

Newest additions to this large multiple-purpose project are Nimbus Dam and power plant, features of the project's American River division, completed in 1954. The dam is an 800-ft-long concrete gated structure. The power plant houses two 6,750-kw units. First power from the Nimbus plant is scheduled for March 1955. On the same division, the structure for the Folsom power plant was completed in 1954. This plant, containing three 54,000-kw generating units, has a total capacity of 162,000 kw. The Folsom plant is expected to produce first power in April 1955 and be in full production by the fall of 1955.

Glendale PS Dept.

The budget for capital expenditures for the current fiscal year is higher than last year primarily because of an expansion program made necessary by the annexation of a rather large area adjacent to the northerly portion of the city involving approximately 4,000 consumers.

Total budget for 1954-55 is $2,112,000, the principle items being the completion of two 8,000-kva substations, each with four outgoing 4-kv feeders, the construction of approximately 13 miles of 34.5-kv transmission lines and the acquisition of the distribution plant

Splicing a 138-kv, 1,500-MCM oil-filled cable, Los Angeles Department of Water & Power

of the Southern California Edison Co. in the annexation district.

The normal budget program will consist principally of replacing older overhead pole lines that have passed their economic life. Included also is the replacement of four induction voltage regulators with larger step-type regulators.

Street Light Program

This is the second year of an eight-year street light improvement program which the city announced last year. The first year saw all lamps on two-light standards increased from 4,000 to 6,000 lumens and 388 lamps in the residential area changed from the old style bare lamp with radial wave reflectors to 2,500-lumen lamps with refractor-type enclosing globes, and with spacing not to exceed 300 ft. It is also contemplated to install mercury-vapor installations on three major thoroughfares.

Increase in both maximum demand and consumption was somewhat lower than last year. The peak demand of 47,200 kw was 3.7% above 1953 and the kwh consumption of 191,600,000 was 5.2% above last year. During the year 3,500 kva of distribution transformer capacity were added to the system as well as 1,060 new service connections. — *L. W. Grayson, general manager and chief engineer.*

Imperial Irrigation District

Capital expenditures on the district's power system amounted to $2,200,000 in 1954. The program for 1955 involves the outlay of $5,000,000 for additions and betterments.

Completion of the 10,000-kw Drop No. 2 power plant at the end of 1953 brought to a close the construction of new generation under the Tenth Bond Issue, leaving only one item of transmission line construction to be carried out in 1954. Reconstruction of a major portion of the old 88-kv transmission line between Blythe and Calipatria was completed in December 1954 and, when substation work is completed in the near future, will provide a second 161-kv interconnection with the Parker-Davis system of U. S. Bureau of Reclamation for the delivery of purchased energy.

Expansion of facilities under the Eleventh Bond Issue was started during 1954 with the placing of orders for turbines, generators, transformers and other equipment for the 33,000-kw Pilot Knob power plant on the upper All-American Canal. Engineering for the plant will be completed early this year and a contract for grading of access roads, relocation of railroad facilities and spur track construction is presently being carried out. Bids will be called for in February on a general construction contract for the entire plant and substation, with completion to be called for near the end of 1956.

Transmission substation capacity was increased by 33,333 kva and 3,000 kva of distribution substation transformers were added last year.

The annual system peak of 86,500 kw exceeded the 1953 peak by 10.5% and kilowatt-hour sales followed closely the predicted pattern by reaching 386,317,000 kwh.—*B. A. Weiss, executive engineer.*

Los Angeles Dept. of W&P

Construction expenditures for new and improved plant facilities in 1954 were approximately $55,000,000. In order to keep pace with the growth of the city and the increased loads that are to be served, the 1955 program contemplates the continuation of this high level of construction, and the amount, including provision for additions and betterments to existing plant, will be approximately $60,880,000.

The first two units at the Valley steam plant were placed in service during the year, adding 200,000 kw of steam generating capacity to the system. No new hydroelectric plant capacity was added, but construction commenced on a reregulating reservoir in the Owens Gorge, to be designated Pleasant Valley Dam, located approximately 2.5 miles below Control Gorge power plant. The purpose of this reservoir is to make available the full peaking capability of the Owens River Gorge plants and meet downstream irrigation requirements. A 3,200-kw generating plant will be installed at the dam site to generate energy at this location.

Several new transmission lines were completed. These lines form a part of the necessary interconnection between the Valley steam plant and existing and proposed new receiving stations. Construction consists of 3.0 miles of three-circuit tower line with two 138-kv circuits of 795 MCM ACSR and one 115-kv circuit of 300 MCM copper; 13.0 miles of three-circuit tower line with two 138-kv circuits of 795 MCM ACSR presently installed; 6.9 miles of double-circuit 138-kv tower line using conductors of 1,113 MCM ACSR; and 8.7 miles of double-circuit 138-kv using conductors of 795 MCM ACSR. All lines are provided with two ½-in. steel overhead ground wires.

No transformer bank changes were made in receiving stations, but several new distributing stations were completed during the year. These new stations, together with bank changes in existing stations, added 83,250 kva transformer capacity to the system. Distribution lines were added as follows: 2.0 miles of 34.5-kv overhead and 19.1 miles of 34.5-kv underground;

121.0 miles of 4.8-kv overhead primary; and 19.4 miles of 4.8-kv underground primary. The 1954 system peak was 1,104,000 kw on Dec. 9.

Construction continues at the Valley steam plant and the third and fourth units, each with a capacity of 156,250 kw, are scheduled to go in service in June and December 1955, respectively. This will result in a total installed capacity of 512,000 kw at this point. No new hydroelectric generating capacity is planned during the year, but work will continue on the reregulating reservoir and power plant in the Owens Gorge. Transmission line construction will include several sections necessary to interconnect the proposed new Scattergood steam plant with an existing and proposed new receiving station. Overhead construction will consist of 7.3 miles of two single-circuit 138-kv tower lines, 2.1 miles of double-circuit 138-kv tower line, and reconstruction of 3.0 miles from 138-kv double-circuit tower line to four-circuit tower line. Underground construction for this interconnection will consist of 6.7 miles of 138-kv underground cable.

Receiving station capacities will be increased by the net addition of 38,000 kva at existing stations and two new stations will add 194,000 kva of transformer capacity. Several new distributing stations will be completed and capacity at these stations, together with bank changes in existing stations, will add 187,500 kva of transformer capacity. New distribution line construction in circuit miles will include: overhead, 29 miles of 34.5 kv and 121 miles of 4.8 kv; underground, 22 miles of 34.5 kv and 14 miles of 4.8 kv.

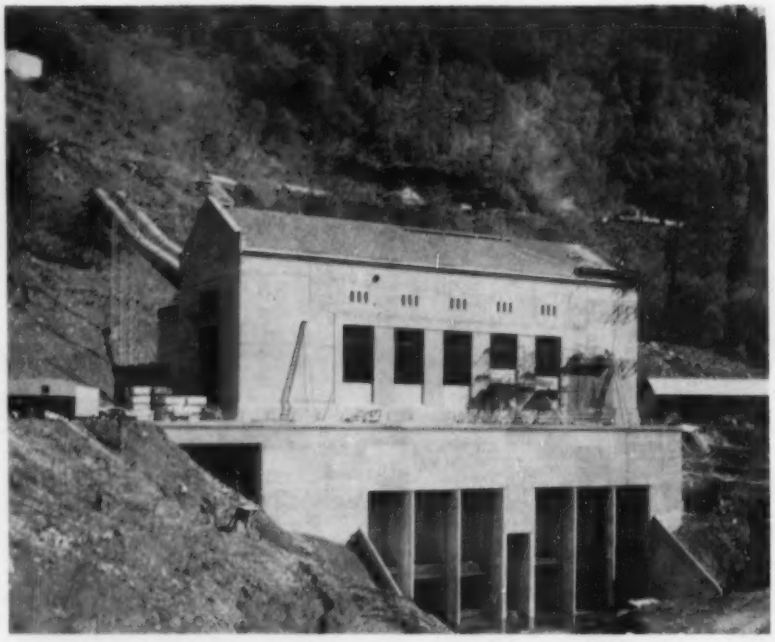
The system generation peak in 1955, as presently estimated, should be approximately 1,190,000 kw.—*Ivan L. Bateman, chief electrical engineer and assistant manager.*

Modesto Irrigation District

Capital expenditures for 1954 were approximately $566,000 and are anticipated to be $572,000 in 1955. A 5,000-kva, 69/12-kv unit substation and 11½ miles of 69,000-v transmission line were added to this system in 1954. Approximately 1,000 new services were installed. Expansion to the 12,000-v underground distribution system in the downtown area has been made.

An additional 11½ miles of 69,000-v transmission line will be constructed in 1955. This line will be energized 12 kv for a period of three or four years or until load growth demands a 69/12-kv substation. At that time it will be energized at its rated voltage.

About nine miles of 12- and 4-kv distribution line were constructed in 1954 and the same rate of construction is expected in 1955. Normal conversion of 4 kv to 12 kv in the fringe areas will proceed as has been the case for the past several years.—*C. E. Plummer, chief engineer.*



Pit 4, 84,000-kw hydro plant of Pacific Gas and Electric Co. is scheduled for mid 1955

Pacific Gas and Electric

July 1954 witnessed the recording of a new high annual peak load of 3,693,300 kw for this company, a growth of 10% over the July 1953 peak.

Approximately $129,000,000 were expended on electrical facilities alone last year, compared with $137,000,000 in 1953; $91,000,000 are expected to be spent for electrical construction during 1955. This, together with gas and other construction expenditures, will increase construction expenditures from the start of 1946 through 1955 to a total of approximately $1.5 billion.

Acquisition of Coast Counties Gas & Electric Co. during 1954 added the following principal facilities to the PG and E system: 221,000 kva of substation transformer capacity, 113 line miles of 110- and 60-kv transmission line, 1,900 line miles of distribution line and a total of 15 offices, principally in the San Joaquin Valley and the Contra Costa County and Santa Cruz areas.

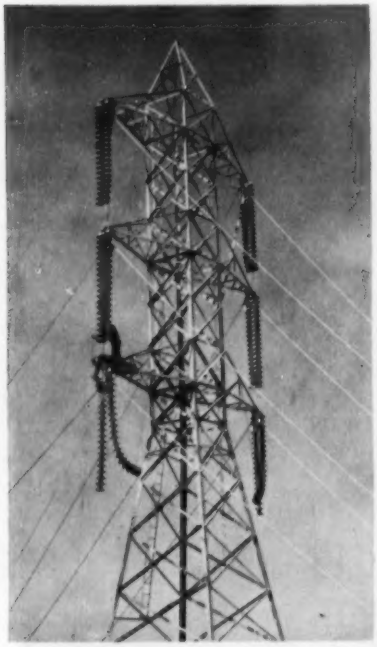
The four-unit, 600,000-kw Pittsburg steam plant was placed in operation during 1954, one unit each in August and September and two in December. Cost of this sizable addition to the company's resources is estimated at $75,000,000. Construction of the two-unit Morro Bay steam plant in San Luis Obispo County is well along, having started in June 1953. The first of its two 150,000-kw units is expected to be placed in operation by the summer of this year and the second in 1956. Cost of the Morro Bay plant will be about $44,300,000.

Ground was broken for the new 50,000-kw Humboldt Bay steam plant near Eureka. This plant is scheduled for operation in the autumn of 1956; $8,100,000 is the estimated cost of this addition.

Replacement of old Murphys power house on Angels Creek in Calaveras County was made early last year. The new 3,800-kw outdoor plant was placed in operation in March, at a cost of about $1,335,000.

The new Pit No. 4 hydroelectric project on the Pit River in Shasta County is nearing completion. The two 50,000-kva units, each driven by a 62,000-hp, Francis-type vertical turbine, are scheduled for operation during the summer of 1955. This 84,000-kw hydro development, which includes a 21,500-ft tunnel and two 12-ft-diameter penstocks each approximately 800 ft long, will cost on the order of $25,200,000.

Announcement was made in September 1954 of plans for construction of the new Poe hydroelectric development on the North Fork of the Feather River in Butte County. This project will include a pressure tunnel about 6.5 miles in length, two penstocks approximately 11 ft in diamenter and two 63,000-kva generators each driven by a 73,000-hp, Francis-type vertical tur-



Large all-aluminum 220-kv line, PG and E

bine. It is expected that this 106,000-kw project, estimated at a cost of $37,600,000, will be placed in operation during the summer of 1958.

Transformer capacity of approximately 1,400,000 kva, including 805,000 kva of step-up capacity at generating stations, was added to the transmission substation system during 1954. This figure represents 230/115-kv and 115/60-kv autotransformer capacity, except for the step-up portion. For the current year, it is estimated that 925,000 kva of like capacity will be added, including 300,000 kva of step-up.

During 1954 the company constructed 315 line miles of transmission lines, with about the same amount anticipated for this year. Major effort in this classification was the 125-mile, 220-kv Pittsburg-Panoche line, twin circuit towers with one circuit strung with 1,113-MCM all-aluminum conductor.

A large number of distribution substations were constructed or enlarged during the past year, adding about 250,000 kva of transformer capacity. It is estimated that 200,000 kva will be installed this year. These capacities represent secondary voltages under 50 kv and primary voltages up to and including 115 kv. Construction of distribution lines, including line extensions, totaled 1,760 line miles in 1954 with 1,800 estimated for 1955. The company's electric customers totaled approximately 1,613,000 at the end of 1954. This was an increase of 99,000 which included about 47,000 acquired through the merger with Coast Counties Gas & Electric Co. — *Walter Dreyer, vice-president and chief engineer.*

Pasadena L&P Dept.

During the fiscal year 1953-54, energy sold in Pasadena exceeded the previous year by 6.1%. Total revenues increased 6.6% and operating expense 9.5%. Additions to capital amounted to $640,512.11.

Distribution transformers in service increased from 95,447 kva to 101,098 kva or 5.9%. Number of meters increased from 45,058 to 49,970 or 2.1%.

Construction work included primarily installation of a new 40,000-kw Broadway No. 1 steam generating station and installation of a new 34,000-v receiving station C. In addition, we are installing two 34,000-v transmission lines, which will be used to feed the northwest area of the city. These lines are underground for approximately two miles and overhead for one. The generator, receiving station and transmission lines will be placed in operation during January 1955. Contracts have been let to furnish the turbine generator and boilers for a new 40,000-kw steam generator station known as Broadway No. 2. It is expected that this new generator will be completed during the latter part of 1956. Two new substations of four circuits each, having a distribution voltage of 4,160, will be placed in operation during the early part of 1955. These stations will be expanded to twelve circuit substations in the future.

The department estimates that the peak demand and load will increase at the rate of approximately 7% during the next year.—*T. M. Goodrich, general manager and chief engineer.*

Riverside PU Dept.

Installation of an additional 4,600-kva double-ended substation to serve the fast growing residential area in the southwest section of the city highlighted the expansion program of the Riverside Light Department in 1954. Two distribution lines of 336,400-cir-mil ACSR were constructed to serve as main trunk feeders in this area.

Thirty-five new residential subdivisions necessitated 12 miles of additional primary distribution lines and an approximate 10% increase in installed distribution transformer capacity. The practice of using banked secondaries in all new residential tracts and either distribution transformers with built-in secondary breakers or the fusing of secondary mains was continued and expanded with continuing excellent results.

Underground expansion in the downtown area consisted of constructing and outfitting three new vaults and three new manholes on separate primary feeders. One of the vaults contains an automatic transfer switch to provide greater continuity of service in conjunction with a stand-by primary circuit for the new Community Hos-

New eastern district operating headquarters at El Cajon, Calif., was one of system betterment jobs of San Diego Gas & Electric Co.

pital now under construction here.

A 20% increase in wind machines to protect citrus orchards connected to the system often caused peak loading to occur in the early morning hours on one or two feeder circuits during the winter months—a variation in the normal peak loading time for utilities in general. This new load growth necessitated scheduling a 2,000-kva package unit substation for operation in the center of the wind machine load in 1955.—*Don Campbell, distribution engineer.*

Sacramento MUD

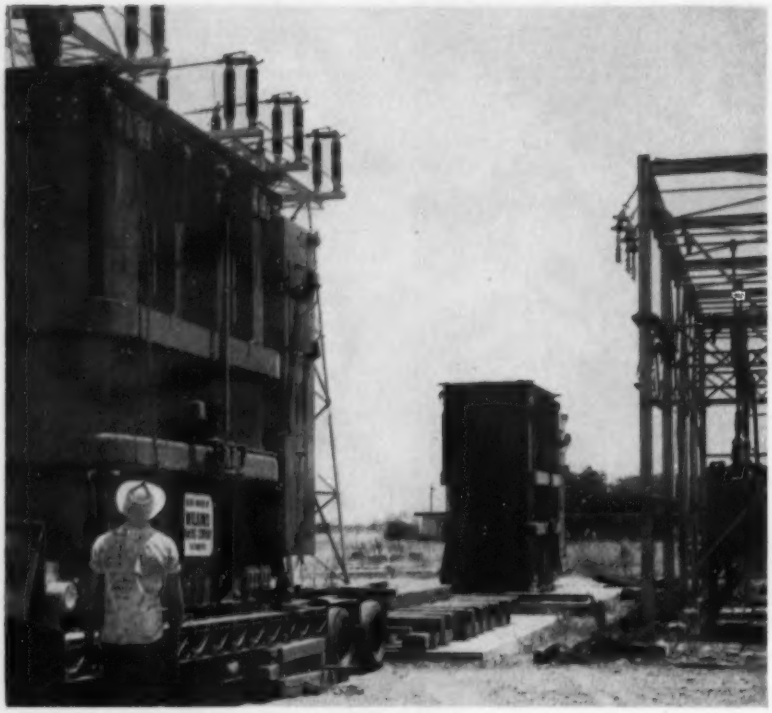
Energy sales for the year 1954 amounted to 730,000,000 kwh, approximately 11% higher than 1953. System peak demand rose to 171,000 kw, approximately 18% higher, while number of consumers served at the end of the year totaled 115,000, only about 5.5% greater than the previous year.

Plant expenditures for the year 1954 amounted to $5,500,000. Major items included in the completed construction were two miles of double-circuit 115-kv high-pressure pipe-type cable, three miles of double-circuit 115-kv steel-pole line, 66 miles of 23-kv and 69-kv subtransmission lines; a 33,000-kva, 115/12-kv supply point to serve the feeders to the underground network; a 35,000-kva, 115/23-kv subtransmission supply station to serve the southern part of the city of Sacramento, and nine unit-type distribution substations representing a net addition of 34,000 kva.

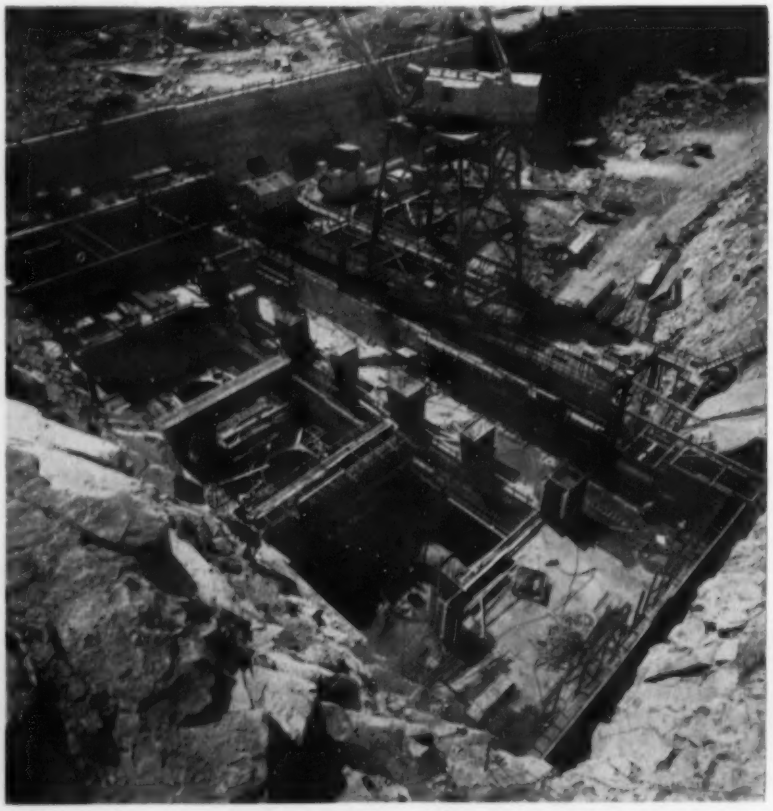
The 1955 budget includes $7,900,000 to continue a stepped-up program of plant expansion to permit the district to receive power directly from the Central Valley Project at 230 kv. Included in this program is a 290,000-kva, 230/115/69-kv substation; 21 miles of 115-kv double-circuit steel-tower line, 18 miles of which will utilize 954-MCM aluminum conductor; 45 miles of 69-kv and 23-kv subtransmission lines; a 35,000-kva, 115/23-kv addition to the North City substation; a 35,000-kva, 115/69-kv addition to the South City substation, and 10 unit-type distribution substations.

Underground work during 1955 will include one 23-kv low-pressure gas-filled cable circuit approximately 1½ miles long, the installation of 15 12-kv network units totaling 9,500 kva and the continued conversion of the old 4-kv fed underground system to the new 12-kv fed secondary network. It is interesting to note that service to the new State Employment building will be from a 480Y/277-v spot network requiring four 1,000-kva, 12-kv network units.

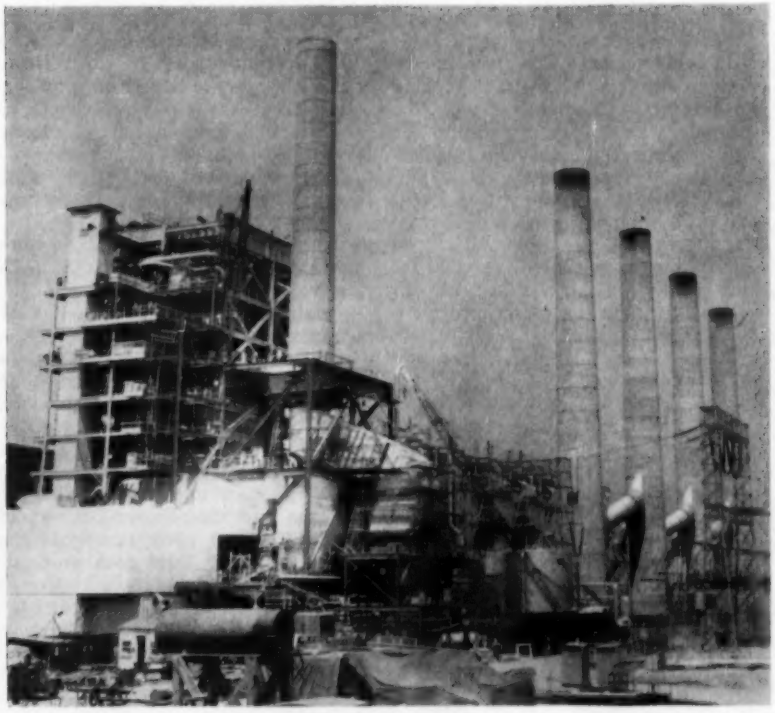
Continued growth in kw demand and energy usage in 1955 is expected



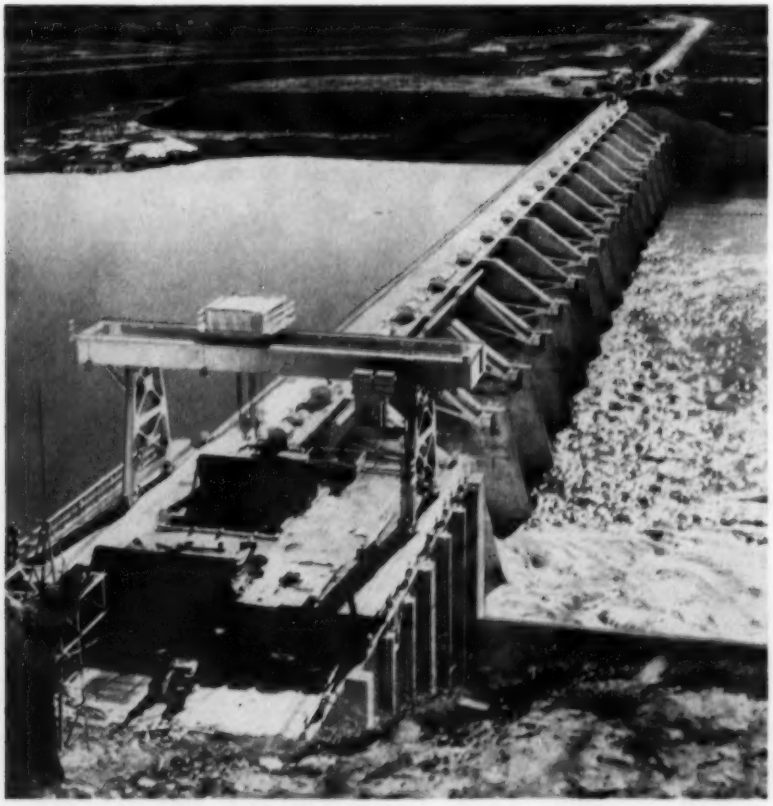
Transformers for new South City substation of Sacramento Municipal Utility District



First 54,000-kw unit at Folsom plant of Central Valley Project will be ready in July



Foreground, Redondo unit 5 of Southern California Edison Co. went in service last fall



First unit at Nimbus Dam, USBR California Central Valley Project, is due in March 1955

to approximate 10%, while number of consumers is expected to increase by about 5%.—*Charles R. Day, electrical engineer.*

San Diego G&E

The 1954 system peak of 389,000 kw, which occurred in December, exceeded 1953 peak by 30,000 kw or 8.4%. December was relatively warm and dry so the peak probably would have been higher under average weather conditions.

Capital expenditures for new customer extensions in 1954 were $2,700,000 as compared with $3,200,000 in 1953. The estimated expenditure for 1955 of $2,500,000 reflects continued flattening of the abnormal customer growth curve of previous years. Approximately 11,500 new electric customers, including 2,175 acquired through purchase of Escondido Mutual Water Co., were added in 1954 to bring the total customer count to nearly 238,000.

Expenditures on electric plant facilities in 1954 amounted to over $24,000,000, a record high for additions and betterments; $12,000,000 were spent to complete the new Encina steam generating plant at Carlsbad. The first 100,000-kw unit at Encina went into commercial operation on Nov. 23, 1954, thereby boosting system capacity by about 30%. Unit No. 2 at Encina is under construction with much of the foundation work completed at the end of 1954. Accumulated costs on the Encina unit No. 2 project amounted to more than $1,000,000 in 1954, with a $7,000,000 investment planned for 1955. We hope to have this second unit in service in September 1956.

Approximately 241,000 kva of transmission substation transformer capacity were added in 1954. This increase together with 90 miles of transmission line, much of it stemming from the new Encina plant, accounted for expenditures of over $3,500,000. Plans for 1955 include the addition of 50 miles of line with an estimated expenditure of about $1,000,000.

Distribution facilities were also greatly improved in 1954. In this record construction year, the transformer capacity of distribution substations was increased by 50,300 kva. The 290 miles of distribution line added in 1954 include lines of the electric distribution system of the Escondido Mutual Water Co. purchased in May 1954. These and other projects constructed with an outlay of over $4,500,000 have greatly strengthened and integrated the entire system. Plans for 1955 call for construction of numerous feeder lines and the over-all distribution expenditures, including new customer service, will be about $5,250,000.

The past year has seen the opening of our Eastern district office and headquarters in El Cajon. This unit, complete in itself, will place both construction and customer service facilities closer to our fastest growing customer area just east of San Diego. We estimate that 1955 capital expenditures for electric plant will approximate $14,400,000 or about 60% of 1954.—*H. A. Noble, vice-president in charge of operation.*

Southern California Edison

Approximately $78,500,000 were expended during the year 1954 for plant additions to generation, substation, transmission line, distribution line and other system betterments. The budgeted amount for the calendar year 1955 is approximately $76,000,000 for like system additions and betterments.

During the past year, 840 line miles of distribution circuits were placed in service and 81 miles of transmission circuits were constructed. Two new distribution substations were constructed with a capacity of 32,500 kva. Transformer capacity of 154,100 kva was added to existing distribution substations and 180,000 kva added to existing transmission substations. More than 75,000 new meters were connected to the system.

Construction work on Redondo steam station No. 2, started in November 1952, was completed and the initial unit (Redondo No. 5) was placed in commercial operation on Oct. 11, 1954. This station is adjacent to and directly south of Redondo No. 1 in Redondo Beach. The 156,250-kv turbogenerator with a 1,140,000 lb per hour steam generator and associated facilities cost approximately $25,200,000 and increased the system net effective operating capacity by 160,000 kw. The turbine is of the tandem-compound triple-flow exhaust type with throttle conditions of 1,800 psig, 1,000° initial temperature with 1,000° reheat. Space is available and common facilities are provided for future expansion and installation of a second similar unit when the need arises.

The Vermilion Valley Dam, on which preliminary construction work was started in May 1953, was completed and dedicated Oct. 19, 1954. It is a compacted earth-fill dam, built across Mono Creek in Fresno County, with a crest length of approximately 4,250 ft and a height of approximately 160 ft from stream bed to top of spillway gates. The lake to be formed by the dam was named Lake Thomas A. Edison by President Harold Quinton at the dedication ceremonies on Oct. 19, 1954, in commemoration of the nation-wide observance of Light's Diamond Jubilee. It will have a gross storage capacity of approximately 125,000 acre-ft. While no power house is included in the project, it is estimated that operation of Lake Thomas A. Edison in conjunction with the company's existing plants in the Big Creek-San Joaquin River area will result in an average annual gain of 122,000,000 kwh from the existing plants and, in a very dry year, will increase the aggregate dependable capacity of such plants by as much as 76,000 kw and produce 440,000,000 kwh. Approximate total cost of the project is $8,650,000.

The company's Laguna Bell substation, constructed in 1923, was the world's first 220-kv substation. Subsequent to World War II, new industry in the area served by the station created new demands so great that complete modernization was required. This major program, started in June 1952, was practically complete at the end of 1954 at a cost of approximately $4,000,000 as compared to original construction costs of $1,000,000. The 220-kv pedestal-type buses were replaced with new tension-type buses; a new 220-kv position was added; three 60,000-kva and one 75,000-kva 220/66-kv transformer banks were replaced with four 90,000-kva 220/66-kv banks, increasing the 220/66-kva capacity of the station from 255,000 kva to 360,000 kva; all 66-kv oil circuit breakers, each with an interrupting capacity of 1,500,000 kva, were replaced with 66-kv breakers having an interrupting capacity of 3,500,000 kva; practically all the 220-kv breakers, each with an interrupting capacity of 3,500,000 kva, were replaced with oil circuit breakers having an interrupting capacity of 10,000,000 kva and the remaining 220-kv oil circuit breakers are scheduled for similar replacement in the near future; a new control house was constructed with complete electrical air conditioning, kitchen facilities and a vertically mounted dispatch board of pleasingly semicircular design constitutes the main feature of the control house.

Construction work on El Segundo unit No. 1 of the new El Segundo steam station at El Segundo, Calif., started during the latter part of 1953, was over 50% complete at the end of 1954. In September 1954, construction of El Segundo unit No. 2 was authorized and engineering and purchasing are well under way. Each of the two units will be a duplicate of Redondo unit No. 5 with a guaranteed capacity of 156,250 kw and an estimated net effective operating capacity of 160,000 kw. Energy to each turbogenerator will be supplied from each unit's individual boiler capable of producing 1,140,000 lb of steam per hour at 1,800 psig, 1,000° initial temperature with 1,000° reheat. El Segundo unit No. 1 is scheduled for operation in July 1955, and El Segundo unit No. 2 in September 1956. Total cost is estimated at $42,700,000.

Late in 1954, construction of Alamitos steam station was authorized. It will be located on undeveloped lands near Alamitos Bay and east of Long Beach, Calif. Initial installation will consist of one steam turbogenerator unit with its individual boiler, similar to Redondo No. 5, El Segundo No. 1 and El Segundo No. 2. This new $23,500,000 project is scheduled for operation in November 1956. Procurement

Foundation work starts for 16,500-kw Canon City plant of Southern Colorado Power Co.

has been completed for the land and transmission line rights-of-way. Deepening of the El Cerritos drain channel, grading of the steam plant site, and foundation explorations are under way.

Power from the No. 1 unit at Alamitos will be transmitted at 220 kv over a single-circuit 220-kv transmission line approximately 5.3 miles long to be built on double-circuit steel towers, to a new 220/66-kv substation scheduled for start of construction in 1955 and completion of the initial portion in 1956. The new station, designated as Del Amo substation, will be located in the southeasterly portion of Los Angeles County. Initial construction plans involve five 220-kv double bus positions, two 75,000-kva banks of 220/66-kv transformers, and 11 66-kv transmission lines. The substation will be interconnected with the company's 220-kv transmission system by looping the present Barre-Lighthipe 220-kv line into the station. It will serve the dual purpose of receiving the output of the Alamitos No. 1 unit and also of being a source of 66-kv supply to contiguous areas served by the company. The presently estimated cost of these station facilities and the initial portion of the 220-kv line from Alamitos is approximately $3,500,000.

Twelve new distribution substations are planned for construction in 1955. The new substations, together with additional transformers to be installed at existing transmission and distribution substations, will require approximately 333,500 kva of new transformer capacity.

Plans are in progress to construct 956 line miles of transmission and distribution circuits in 1955 and to connect approximately 70,000 new meters. —*H. A. Lott, executive engineer.*

Turlock Irrigation District

Load growth in the Turlock Irrigation District increased 12% last year. Usage by 17,700 customers resulted in a 27,300-kw system peak and required line and service construction amounting to $210,000.

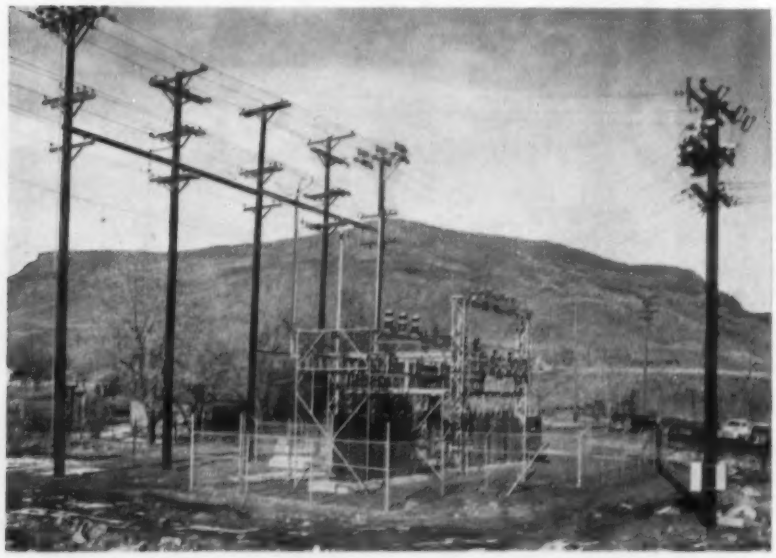
Fifteen miles of 12-kv distribution line and six miles of 69-kv transmission line were added to the system. New customers served numbered 450.

Expected continuation of growth is provided for in a 1955 construction budget of $362,000 to cover additions to distribution substation capacity plus the start of a new project calling for two 115-kv and 69-kv substations with interconnecting 115-kv transmission line.—*L. H. Parker, electrical engineer.*

Colorado

Colorado-Big Thompson Project, USBR

Completed in 1954 was the Flatiron power and pumping plant. With completion of this installation virtually all major construction on this transmountain diversion project is finished. The Flatiron plant contains two 31,500-kw generating units and one reversible pump-turbine of 8,500 kw capacity. When the unit functions as a pump-motor it will deliver 379 cfs against a head of 240 ft.



New substation of Colorado Central Power Co. serves growing load at town of Golden

Colorado Central Power

Growth in new customers during 1954 was up 7% over 1953; kilowatthour sales were up 20% and system peak demand increased 12%.

The company spent for construction during 1954 $1,200,000 while the construction budget for 1955 provides for an expenditure of $1,100,000.

During 1954 $650,000 was spent for connecting new customers and routine replacements. There was spent $350,000 for major system improvements and $200,000 for additions and improvements to company buildings and property, transportation equipment and other miscellaneous capital improvements.

During the year in the Arapahoe County district, the company built several new 13-kv feeder lines to fringe areas to tie into a second 115/13-kv, 15,000/20,000-kva substation which is to be placed in service early in 1955.

Considerable more cutover work was completed in the changeover from 4 kv wye to 13 kv wye in the urban fringe areas of Englewood and Littleton. All the rural area has been converted in the Arapahoe district.

A new heavy duty 13-kv express feeder was built to the city of Golden to provide additional capacity to that city and to all the fringe area in the Jefferson County district. There was also considerable cutover work done in this area from 4 kv wye to 13 kv wye.

Early in 1954 the company acquired ownership of the Evergreen Public Service Co., which operated in the mountain resort area of southwest Jefferson County, serving the communities of Evergreen and Kittredge as well as the surrounding rural area. Considerable work was done during the remainder of the year to increase capacity and improve voltage.

The cutover from 7 kv delta to 13 kv wye was completed in the Hudson, Keensburg and rural areas of southeast Wold County and considerable work was done on the same cutover in the Johnstown and Milliken area of west Weld County.

Plans for 1955 call for a continuing expansion of the distribution system to serve several new subdivisions in the Arapahoe district. These developments will all be served with 13 kv wye.

A new 13-kv feeder will be built to the newly acquired Evergreen district to increase capacity and improve voltage. There will also be several capacitor and regulator additions installed in all the Jefferson County district.

The south Weld County district is anticipating a greater number of irrigation pump installations during 1955 and plans are being made at this time to install capacitors and regulators as well as some line reinforcement to

meet this increasing load demand.

During 1955 the company plans to begin a program of improving its communications by installing a number of micro-link stations that will provide better control of our two-way radio equipment. These will also provide voice channels to improve our inter-district communications. Telemetering and switching control will be added during following years.—*Lee R. Jones, vice-president in charge of operations.*

Colorado Springs PU Dept.

About $1,000,000 was spent in 1954, part of which completed the first two units in the new George Birdsall steam plant and the remainder of which was used for a large number of small additions to transmission and distribution facilities.

New building in this area, probably stimulated by the beginning of planning activities for the new Air Force Academy to be built here, has caused load growth above corresponding months of 1953 from 25% to 35%. Ample generating capacity is available now to handle this load increase and the transmission and distribution facilities should be ample by the summer of 1955, but are somewhat overloaded this winter.

About $1,000,000 will be spent again in 1955 for these transmission and distribution facilities and for the first steps toward the addition of a 22,000-kw unit to the new George Birdsall plant.—*F. H. Wiley, superintendent, electric division.*

Public Service of Colorado

The Public Service Co. of Colorado construction expenditures during 1954 were approximately $22,138,000, of which $16,887,000 were for electric facilities. The 1955 total construction program is presently set at $20,816,000, with electric facilities requiring $14,838,000.

The only generating capacity placed in service during 1954 was the 66,000-kw unit at Zuni station in Denver, which became available during July. The 100,000-kw addition to the company's Arapahoe station in Denver has been progressing satisfactorily and is expected to be in operation late in the summer of 1955. It is anticipated that ground will be broken during 1955 for an additional 100,000-kw unit to become the initial installation at a new generating station site near Denver with availability scheduled in 1957.

Approximately 20 miles of 69-kv transmission line were placed in service in the San Luis Valley and three miles of 44-kv line were added to the system during 1954. A 20,000-kva 115-kv distribution substation near Boulder was completed and will be placed in service early in 1955. Distribution substation transformer capacity added was approximately 50,000 kva to serve load growth; approximately 13,000 new electric customers were connected during 1954. The system peak in December 1954 reached a new high of 409,290 kw.

In addition to the generating plant additions mentioned, the 1955 construction program includes the development of a new 115-kv substation in Denver and 11 miles of 115-kv transmission line in the Denver area, and 64 miles of transmission line will be constructed at various locations throughout the system. Approximately 75,000 kva of distribution substation capacity will be added during 1955.—*M. M. Koch, vice-president, electric operations.*

Southern Colorado Power

Expenditures during 1954 for construction purposes were about $2,700,000 and in 1955 will probably be $3,900,000. This rather large expenditure for the company is because of the anticipated completion of the 16,500-kw preferred standard steam unit now under construction at Canon City. The 115-kv line between Pueblo and Canon City mentioned last year has been completed, but a new 115-kv substation will be completed in 1955 at the new plant location.

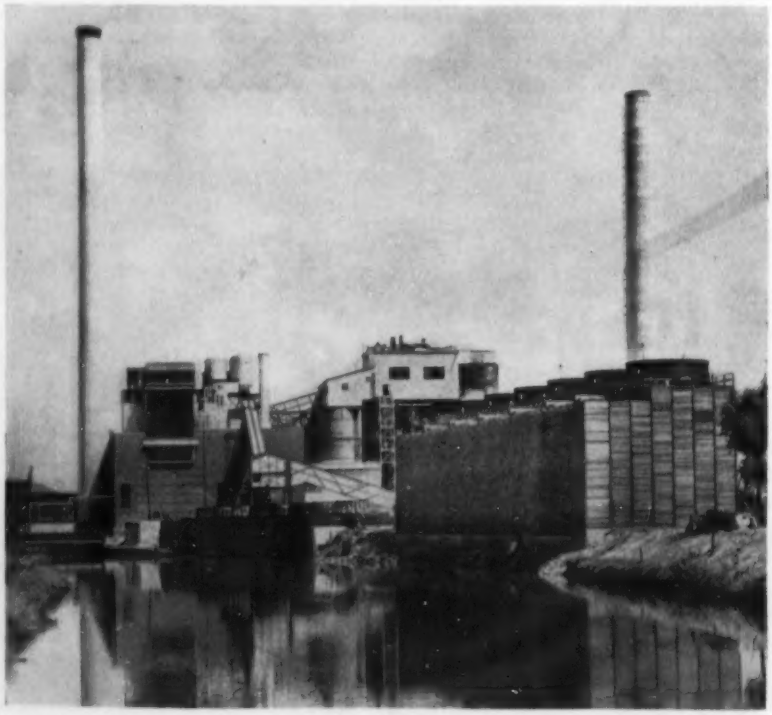
A new substation and switching station will be built in 1955 at the west outskirts of Pueblo. This station will be built as a result of a recent board study showing the necessity of superimposing a 115-kv transmission network over the entire system to step down to distribution. This station will cost about $800,000 and will become a focal point on the system, serving as a terminal for all 115-kv lines and as a terminal for a future 69-kv loop line around the city of Pueblo. It is anticipated that control of this station will be by microwave from the control room of the Pueblo power plant.—*W. C. Porter Jr., vice-president in charge of operation.*

Idaho

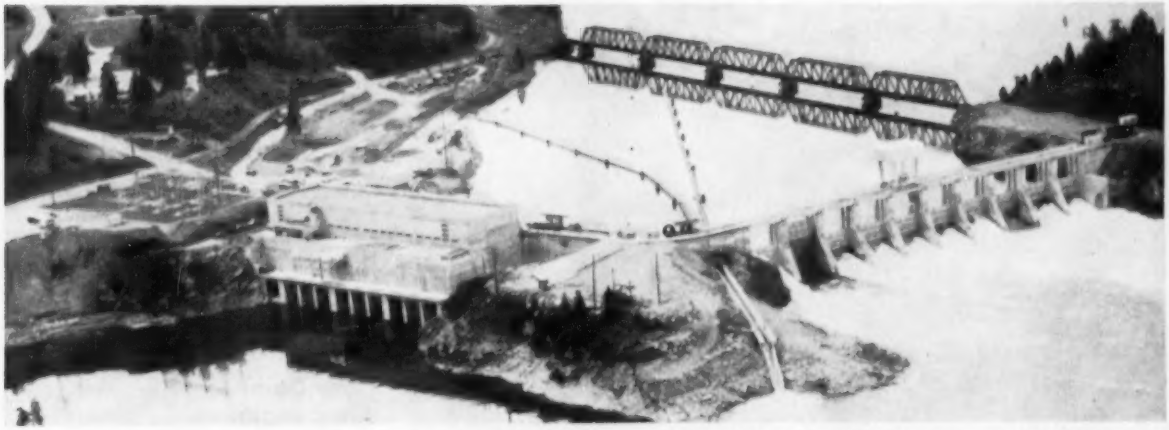
Albeni Falls Dam Army Engineers

Work is advancing on all three units, aiming for No. 1 on the line April 1. At present, it appears that No. 2 will be ready for production by July 1. Power house construction was completed last August.

No. 1 turbine is substantially complete; work on the generator's rotor and stator is in hand, with the unit's test date set for March 1, 1955. No. 2 turbine is substantially complete and



Zuni plant 66,000-kw addition was made by Public Service Co. of Colorado during 1954



Army Engineers near completion on Albeni Falls Dam and 42,500-kw power plant, Pend Oreille River. Storage is 1,153,000 acre-ft

work has been started on the stator and rotor of No. 2 generator. Turbine No. 3 embedded parts are in and work is under way on the rotating parts; installation of No. 3 generator has not been started.

Bonneville Power Administration has finished construction of the Albeni Falls switchyard.

Because of an ample supply of water this season for power at the downstream plants on the Columbia, Albeni Falls Dam is holding its 1,153,000 acre-ft of usable storage in Lake Pend Oreille reservoir until a likely need in late winter or early spring. The dam was completed in June of 1952.

Idaho Power

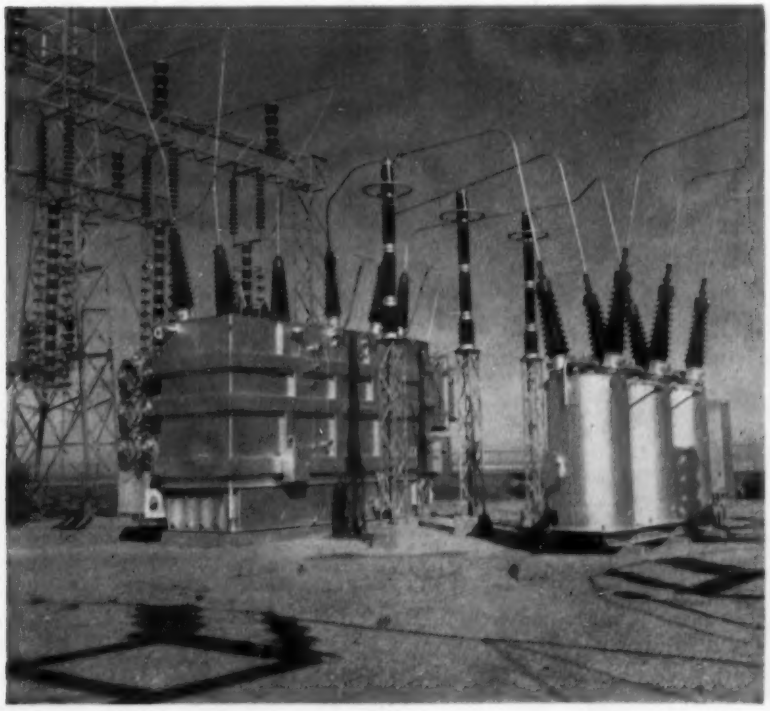
Idaho Power Co., serving the region composed of southern Idaho, eastern Oregon and northern Nevada, spent $6,000,000 on new and improved facilities during 1954. Transmission and distribution lines as well as substations accounted for most of this expenditure.

Power plant construction is withheld awaiting a decision from the Federal Power Commission on licenses to construct three large hydroelectric plants on the Hells Canyon stretch of the Snake River below Weiser, Idaho. These plants will total 783,000 kw.

During 1954 Idaho Power constructed 125 miles of transmission line, 210 miles of distribution line, added 100,000 kva of transmission substation capacity and 33,750 kva of distribution substation capacity. Many miles of overloaded distribution lines were rebuilt as well as increasing the capacity of several substations.

The largest transformer on the system was installed at the Don substation, near Pocatello, Idaho. It consisted of an 80,000/106,640-kva unit equipped with tap changing under load equipment.

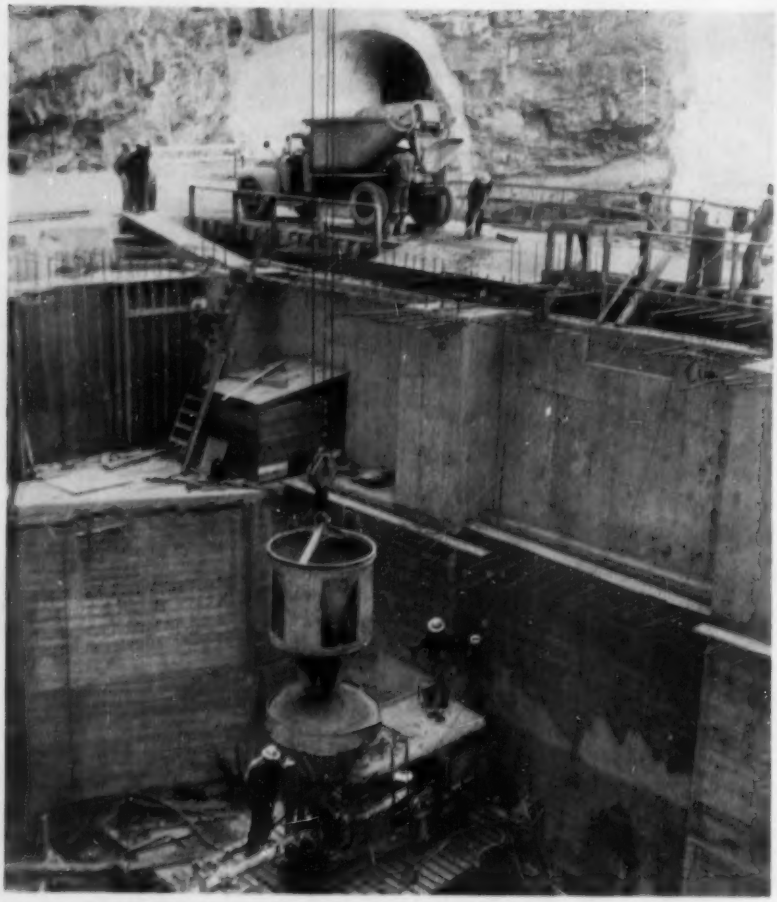
The 1955 budget is $7,555,000. A 138-kv transmission line is under construction between Eden and Milner to serve a new 25,000-kva tie substation and increase the capacity of the 46-kv system in that vicinity. A new 10,000-kva substation will be constructed near Norland, together with a short 138-kv tap line. Both of these stations are the result of increased irrigation pumping. Four new distribution substations will also be constructed to serve new irrigation load. A new 69-kv transmission line is being constructed from Mountain Home to Mountain Home Air Base to supply a new substation at the air base. A microwave link will be constructed between Boise and the Hagerman Valley to relieve the overloaded transmission line carrier channels. There will also be a similar link constructed between American Falls and Pocatello.—*R. E. Gale, vice-president.*



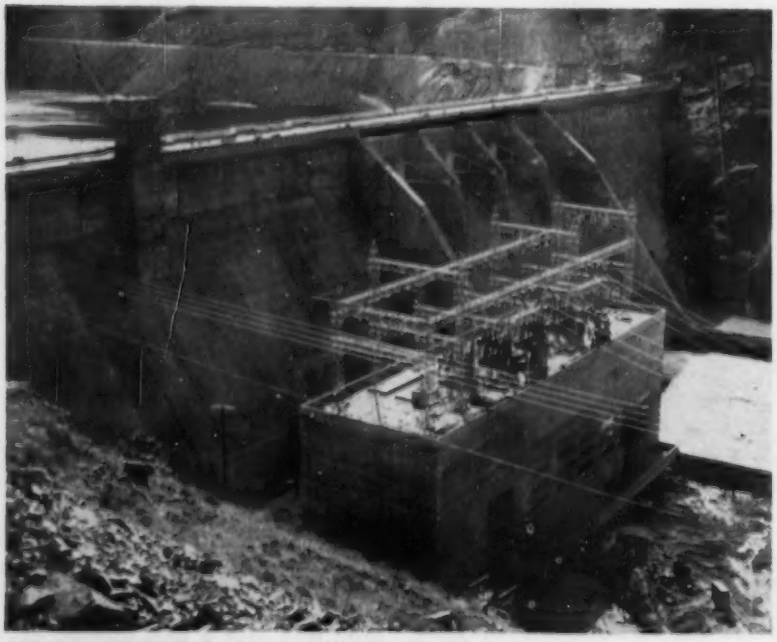
Largest transformer on Idaho Power Co. system is installed at Don substation, Pocatello

Palisades Project, USBR

At the end of 1954, construction of Palisades Dam and power plant was about 65% completed. These features are on the Snake River about 45 miles southeast of Idaho Falls. The power plant is to have a total installed capacity of 114,000 kw. The first of the



Pouring concrete at Montana Power Co.'s Kerr hydro plant for third 56,000-kw generator



Canyon Ferry Dam and power plant, Missouri River Basin Project, Bureau of Reclamation

four 28,500-kw generators is planned to be placed in operation in December 1956. The plant is expected to be in full production by the fall of 1957.

The bureau plans to issue invitations in May to bid on construction of 57 miles of 115-kv, wood-pole, H-frame transmission line from the Palisades switchyard to the Goshen substation of the Utah Power & Light Co.

Montana

Libby Dam
Army Engineers

Additional foundation exploration at axis mile 217 on the Kootenai River was completed late in November under a $23,000 contract by Boyles Bros. Drilling Co. Evaluation of studies of this work is not complete, but no appreciable changes are expected to result in the previous assumptions used in planning the project. Review of local flood-control benefits on the Kootenai River in the United States is nearly complete. This country's application for approval of the project is being considered by the International Joint Commission. President Eisenhower, Northwest States' governors and members of Congress, and many other individuals and groups are pressing for early construction of Libby Dam. Plans for railroad relocations were submitted to the Great Northern officials who then said they wanted to make their own studies. Report on these is being awaited.

Missouri River Basin Project, USBR

An important completion in 1954 was the Canyon Ferry power plant in Montana. Canyon Ferry Dam and its 50,000-kw power plant are on the main stem of the Missouri River near Helena. The first of the plant's three 16,667-kw generating units went into production in December 1953. The plant was in full operation by April 1954.

A major transmission line completed on the project was the 167-mile, 230-kv line running from Bismarck, N. D., through Mobridge to the Oahe dam site in South Dakota. Also completed was the 135-mile, 230-kv line extending from the Corps of Engineers' Fort Randall power plant to the Oahe dam site in South Dakota. The 122-mile, 230-kv line from Fort Randall to Sioux City, Iowa, was also completed in 1954.

In advance stage of construction is the 230-kv transmission line running 204 miles from Big Bend, S. D., to

Granite Falls, Minn. The contract for construction of the footings and erection of steel towers for this line is about 30% completed. Under construction also is the 86-mile, 230-kv line between Jamestown and Fargo, N. D.

In Wyoming, on the Kendrick Project, Alcova power plant was completed. This 36,000-kw plant, the newest addition to the Missouri River Basin power system, is to be in full operation by April of this year.

Construction began late in 1954 on Glendo Dam and power plant, features of the Glendo unit of the Missouri River Basin Project. The dam will be an earthfill structure about 207 ft high. The 24,000-kw Glendo power plant and the Fremont Canyon power plant, to be built later as part of the Glendo unit, will have a combined capacity of 72,000 kw.

Montana Power

The Montana Power Co.'s 1954 construction program was high lighted by the completion of two major projects designed to maintain the utility's position of staying ahead of the power requirements of its service area and generally to prepare for the area's developing load growth.

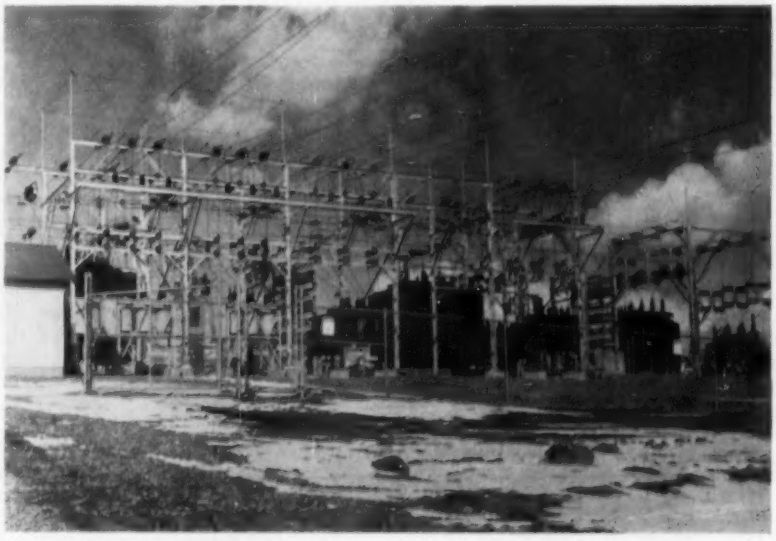
Kerr No. 3 unit was completed in November, adding 56,000 kw of installed capacity to the system. This generating unit, installed in the company's Kerr hydroelectric plant in western Montana, raised the capacity of that plant to 168,000 kw and gave Montana Power a total system capability of 586,000 kw.

Also completed near the end of the year was a 223-mile, 161-kv transmissiion line from Anaconda to Billings. The line, which also includes a 50-kv tap to serve the city of Livingston, stretches across the southern part of Montana. Its two principal purposes are to provide an additional source of power for the rapidly growing Billings-Midland Empire region and to reduce losses in the transmission of power from the Billings steam-electric plant to the western part of the company's system.

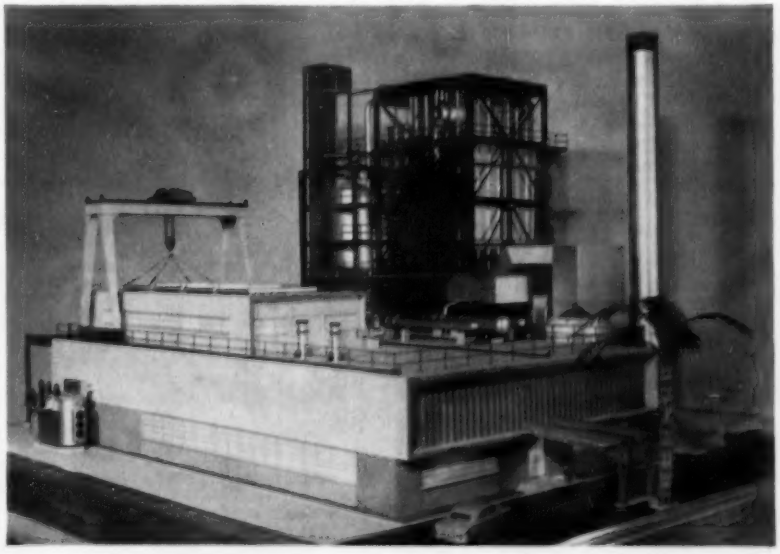
With the Montana Power system fully prepared to meet growth and new loads, major 1955 activity will be devoted to general system expansion and maintenance. Transmission substation capacity will be increased in several sections of the system and some of the smaller transmission lines serving rural areas will be increased in size.

During 1955, the company will continue to work with three other Pacific Northwest utilities in studying potential hydroelectric sites that might be developed by the Pacific Northwest Power Co. to provide future supply for the entire region.

Sprinkler irrigation is an important load for Flathead Electric Co-op., Kalispell, Mont.



Valley Road substation, Reno, Nev., was completed by Sierra Pacific Power Co. in 1954



Model of Clark steam plant under construction by Southern Nevada Power Co., Las Vegas

Nevada

Sierra Pacific Power

Expenditures in 1954 for additions and betterments to the company's electric system totaled $2,000,000, slightly more than originally budgeted. Preliminary estimates set spending for 1955 at $2,000,000, tying in with expectation that growth in load will continue at the present high rate during 1955.

During the past year, two 10,000-kva transformer banks, 60/23 kv, with regulating equipment, and four 2,500-kva 23/4-kv unit substations were installed in the Reno area, with appurtenant 23-kv and 4-kv feeders. Two switched capacitor banks having ratings of 2,700 and 1,800 kvar were installed at substations. Carrier supervisory system between load dispatchers' office at Washoe and Carson City 60-kv switchyard was completed.

Following the pattern of recent years, a large part of the 1955 program is for routine distribution system work. Planned distribution substation additions include a 2,500-kva 60/23-kv bank at Minden and a 5,000-kva 60/14-kv installation near the south end of Lake Tahoe. The latter will be supplied through a new 11-mile 60-kv line extending from Minden.

A new diversion dam will be constructed across the Truckee River about six miles above Reno for replacement of Washoe hydro plant wood-crib diversion built in 1904. The new structure will be rock masonry with thin concrete envelope, about 15 ft in height and 170 ft long.

Right-of-way acquisition and clearing will be completed for a second 120-kv line interconnecting with Pacific Gas and Electric Co. near Donner Summit. Probably construction work will be begun in 1955 on Sierra's 30-mile length of line. Construction of terminal substation of 45,000 kva capacity and completion of the line is programmed for 1956. About 10 miles of new 60-kv line will be built in 1955 in Reno area anticipating the new supply.—*V. D. Armstrong, executive engineer.*

Southern Nevada Power

The year 1954 was a record breaking year for Southern Nevada Power Co. In April the company was reorganized under new management. There were many problems confronting the new management, not the least of which was the planning for an annual load growth of about 22 to 25%.

The allotment of power from Hoover plant to Southern Nevada Power Co. is inadequate to supply the potential load of the company and this factor was recognized by the old management last fall. An order had been placed for a 33-mw steam turbine, but when the new management made a load research study it was evident that 33 mw was too small and, since time was limited, that order was canceled and a new order was placed for a 44-mw AIEE-ASME preferred standard unit, to operate at 1,250 psi and 950 F.

Bids were invited from a number of nationally prominent engineer contracting firms and the contract for engineering and construction of the new plant was awarded to Stearns-Roger Mfg. Co. of Denver, Colo. The contract calls for the commercial operation of this plant not later than Dec. 15, 1955. Excellent progress on construction is being made and there is a possibility that it can be in operation some time ahead of schedule.

This plant is known as Clark station, named after one of the pioneer families of southern Nevada who were involved in the first power service to Las Vegas Valley. Clark station will be the first utility operated steam-electric plant in Nevada.

During the year the company erected and placed in service three 69,000/12,500-v distribution substations, with a capacity of 37,500 kva. These stations are constructed with simple fabricated steel structures, in a conventional manner. Approximately 16 miles of 69-kv line, 39 miles of 12-kv line and 30 miles of 7.2-kv line were completed during the year. For improvement in power factor and voltage level, 2,500 kva of capacitors were installed on 12-kv distribution circuits. This type of installation will be continued during 1955 to correct for the heavy air conditioning load enjoyed by the company during the summer.

During 1955 the steam-electric generating plant will be completed with a relatively large 69-kv switching station at the plant. Plans call for the construction of about 29 miles of 60-kv line and 65 miles of 12-kv line. Three more 69/12-kv stations will be completed, plus five new substations to serve new resort hotels. A rather large installation is contemplated to serve the local water district, which is bringing water to Las Vegas from Lake Mead.

Plans for 1955 include the construction of a new general office building and a new service center involving warehouse, shops and offices for the line department.—*D. D. Smalley, vice-president.*

Oregon

Bonneville Power Administration

Peak energy demand on federal plants was 3,651,000 kw, 5 to 6 p.m., Dec. 27, 1954. This all-time high of demand was made possible by the addition of five generating units during the year. Three units were added at McNary, one at Big Cliff and one at Lookout Point. The seven federal plants produced 21,000,000,000 kwh for Bonneville Power Administration during 1954 for distribution over the

REA Operations — Eleven Western States — 1954

State	Cumulative Construction Loans	1954 Loan Approvals Amount*	Estimated Miles†	Estimated Consumers†	Energized Systems To Dec. 1, 1954 Miles	To Dec. 1, 1954 Consumers	To Dec. 1, 1953 Miles	To Dec. 1, 1953 Consumers
Arizona	$ 20,454,723	$1,439,000	352	2,499	4,285	12,077	4,048	11,442
California	15,661,178	809,000	616 cr.	1,742 cr.	3,069	31,674	2,932	27,988
Colorado	65,591,741	3,823,000	981	2,713	28,711	65,674	28,207	60,948
Idaho	15,305,795	220,000	24	144	6,387	15,000	5,969	14,876
Montana	46,993,051	2,418,000	1,139	1,284	25,270	38,569	23,719	36,358
Nevada	354,000	0	0	0	165	757	165	745
New Mexico	61,993,499	1,599,000	798	2,820	17,857	43,088	17,137	40,769
Oregon	33,669,958	1,265,000	214	950	9,293	31,722	8,896	30,320
Utah	5,890,907	0	85 cr.	527 cr.	1,677	4,400	1,677	4,058
Washington	35,788,619	2,289,930	486	1,447	13,300	33,907	13,107	32,561
Wyoming	26,875,707	1,213,000	362	936	12,174	20,106	11,967	19,153
Totals	**$328,579,178**	**$15,075,930**	**3,655**	**10,524**	**122,188**	**296,974**	**117,824**	**279,218**

* Loans made during year

† Net increase or decrease during year

Calendar of New Generation—U. S. Columbia River Power System

(Most of these units are included in the complete Calendar of New Generation on pages 80-81)

1954—Completed

Date	Size—Kw*	Plant & Unit No.	Agency
April	70,000	McNary 3	Army Eng.
June	70,000	McNary 4	Army Eng.
June	18,000	Big Cliff 1	Army Eng.
Sept.	70,000	McNary 5	Army Eng.
Dec.	40,000	Lookout Point 1	Army Eng.
Total	268,000		

1955—Under Construction

Date	Size—Kw*	Plant & Unit No.	Agency
Jan.	70,000	McNary 6	Army Eng.
March	70,000	McNary 7	Army Eng.
April	40,000	Lookout Point 2	Army Eng.
April	15,000	Dexter 1	Army Eng.
April	14,200	Albeni Falls 1	Army Eng.
May	14,200	Albeni Falls 2	Army Eng.
May	70,000	McNary 8	Army Eng.
June	40,000	Lookout Point 3	Army Eng.
July	70,000	McNary 9	Army Eng.
Sept.	192,000	Chief Joseph 1, 2 and 3	Army Eng.
Sept.	6,000	Chandler 1	USBR
Sept.	14,200	Albeni Falls 3	Army Eng.
Oct.	70,000	McNary 10	Army Eng.
Nov.	6,000	Chandler 2	USBR
Dec.	64,000	Chief Joseph 4	Army Eng.
Total	755,600		

1956—Under Construction

Date	Size—Kw*	Plant & Unit No.	Agency
Jan.	70,000	McNary 11	Army Eng.
March	64,000	Chief Joseph 5	Army Eng.
April	70,000	McNary 12	Army Eng.
June	64,000	Chief Joseph 6	Army Eng.
Sept.	64,000	Chief Joseph 7	Army Eng.
Sept.	70,000	McNary 13	Army Eng.
Dec.	70,000	McNary 14	Army Eng.
Dec.	64,000	Chief Joseph 8	Army Eng.
Total	536,000		

1957—Under Construction

Date	Size—Kw*	Plant & Unit No.	Agency
March	64,000	Chief Joseph 9	Army Eng.
April	27,000	The Dalles (2 fishway)	Army Eng.
June	64,000	Chief Joseph 10	Army Eng.
Sept.	64,000	Chief Joseph 11	Army Eng.
Nov.	156,000	The Dalles 1 and 2	Army Eng.
Dec.	64,000	Chief Joseph 12	Army Eng.
Total	439,000		

1958—Under Construction

Date	Size—Kw*	Plant & Unit No.	Agency
Feb.	78,000	The Dalles 3	Army Eng.
March	64,000	Chief Joseph 13	Army Eng.
May	78,000	The Dalles 4	Army Eng.
June	64,000	Chief Joseph 14	Army Eng.
Aug.	78,000	The Dalles 5	Army Eng.
Sept.	64,000	Chief Joseph 15	Army Eng.
Nov.	78,000	The Dalles 6	Army Eng.
Dec.	64,000	Chief Joseph 16	Army Eng.
Total	568,000		

1959—Under Construction

Date	Size—Kw*	Plant & Unit No.	Agency
Feb.	78,000	The Dalles 7	Army Eng.
May	78,000	The Dalles 8	Army Eng.
Aug.	78,000	The Dalles 9	Army Eng.
Nov.	78,000	The Dalles 10	Army Eng.
Total	312,000		

1960—Under Construction

Date	Size—Kw*	Plant & Unit No.	Agency
Feb.	78,000	The Dalles 11	Army Eng.
May	78,000	The Dalles 12	Army Eng.
Aug.	78,000	The Dalles 13	Army Eng.
Nov.	78,000	The Dalles 14	Army Eng.
Total	312,000		

*Name-plate rating. All completed and planned generation is hydro.

BPA—Branch of Power Resources.

BPA transmission system to 116 customers. Revenue from the sale of this power amounted to $46,000,000. Increases over the 1953 calendar year were: peak demand, 14.7%; generation for BPA, 7.4%; revenues, 4.7%.

Expenditures for new and improved facilities during 1954 amounted to $40,000,000. Approval of the present budget before Congress will provide an estimated $35,000,000 in 1955. The estimate is based on a transmission line program that will keep pace with the schedule of additional generating plant installations. Transmission system additions during 1954 included 323 miles of 230-kv and 39 miles of 115-kv line, with 1,879,499 kva of transformer capacity. Plans for 1955 call for 550 miles of 230-kv and 45 miles of 115-kv line, with added transformer capacity of 783,666 kva.

Peak generating capacity was increased by about 308,200 kw with installation of three units at McNary, one at Big Cliff and one at Lookout Point on the Willamette River.

Peak loads of approximately 6,000,000 kw can be met by the federal system in January 1960, according to the most recent estimates of the Bonneville Power Administration. Total federal installations of about 6,300,000 kw are planned for installations by January 1961.

Key construction activities during 1954 centered on the administration's high-voltage grid to carry scheduled generation from McNary Dam to Portland-Vancouver and southwest Oregon load centers, and from Chief Joseph Dam to Puget Sound and Olympic Peninsula load centers.

All of the 345,000-v McNary-J. D. Ross transmission line is under contract and a 90-mile section between McNary and Wishram is complete and scheduled for energization early in 1955, with initial operation at 230,000 v.

A 105-mile section of the McNary-Maupin-Detroit-Santiam-Albany 227-mile 230,000-v transmission line to carry power from McNary Dam to lower Willamette Valley and southwest Oregon load centers was completed, together with terminal facilities at McNary, at Santiam substation and substation additions at Albany.

Farm Electrification by States

State	Total Farms April 1, 1950*	No. Farms Electrified July 1, 1954	Unelectrified Farms July 1, 1954	Per Cent Electrified Farms
Arizona	10,412	9,652	760	92.7
California	137,168	129,908	7,260	94.7
Colorado	45,578	42,751	2,827	93.8
Idaho	40,284	39,356	928	97.7
Montana	35,085	30,795	4,290	87.8
Nevada	3,110	2,126	984	68.4
New Mexico	23,599	17,588	6,011	74.5
Oregon	59,827	58,863	964	98.4
Utah	24,176	23,725	451	98.1
Washington	69,820	69,168	652	99.1
Wyoming	12,614	11,376	1,238	90.2
Totals	**461,673**	**435,308**	**26,365**	**94.3**

* 1950 U. S. Census of Agriculture

BPA's 133-mile Chief Joseph-Snohomish 345,000-v transmission line right-of-way clearing is nearing completion and all but 20 miles of the line are under contract for construction.

Energization of a new 150,000-kva substation at Bellingham was completed in December for service to the Puget Sound Power & Light Co. and the Whatcom PUD.

Contracts awarded during the year included 76 miles of right-of-way clearing, $308,000; 356 miles of transmission line construction, $4,627,000; substation construction, $1,659,000. BPA's transmission system at the end of the year had 6,541 circuit miles of transmission line and 167 substations energized.

Bonneville's scheduled construction activities for 1955 will focus on completion of the 345,000-v lines from McNary and Chief Joseph Dams. Major new starts will include additions to the BPA 230,000-v grid for carrying scheduled generation from McNary Dam to lower Willamette Valley and southwest Oregon load centers, including a second 105-mile McNary-Maupin 230,000-v transmission line and a 49-mile Detroit-Chemawa 230,000-v line. Southwest Oregon coastal areas will be served by construction of a 23-mile Reston-McKinley 230,000-v line.

Important additions are scheduled for the McNary switchyard and a number of miscellaneous customer services and minor transmission line additions will be contracted for during the coming year.

During the coming year Pacific Northwest contractors will be invited to bid on 182 miles of right-of-way clearing at an estimated cost of $1,485,000; 200 miles of transmission line construction, $2,499,000; 24 substation additions, $2,082,000; six new substations, $405,000; four radio stations, $16,000.

California Oregon Power

During the year 1954 the principal items of plant additions were the completion of the Klamath substation (125,000-kva sub terminating a 230-kv transmission tie with BPA), nine miles of 125-kv transmission line serving the Hanna development (for an anticipated load of 65,000 kw), partial construction of two hydroelectric plants (Lemolo No. 1 and Lemolo No. 2) on the North Umpqua River aggregating 62,000 kw. Under construction are 50.4 miles of transmission lines to be completed in the first 60 days of 1955. In addition, system operation was improved by the installation of a modern load dispatching center at Medford, Ore. These and other production and transmission plant improvements, together with expansion of the company's distribution facilities (160 miles of distribution line added), required a budget of $11,226,955.

A budget of $10,000,000 has been outlined for 1955. This will cover the completion of Lemolo No. 1, 29,000-kw hydro project, continued construction of Lemolo No. 2, 33,000-kw hydro project, and expansion of transmission and distribution facilities to keep abreast with continued load growth in the area served by this company.—*J. C. Boyle, vice-president and general manager.*

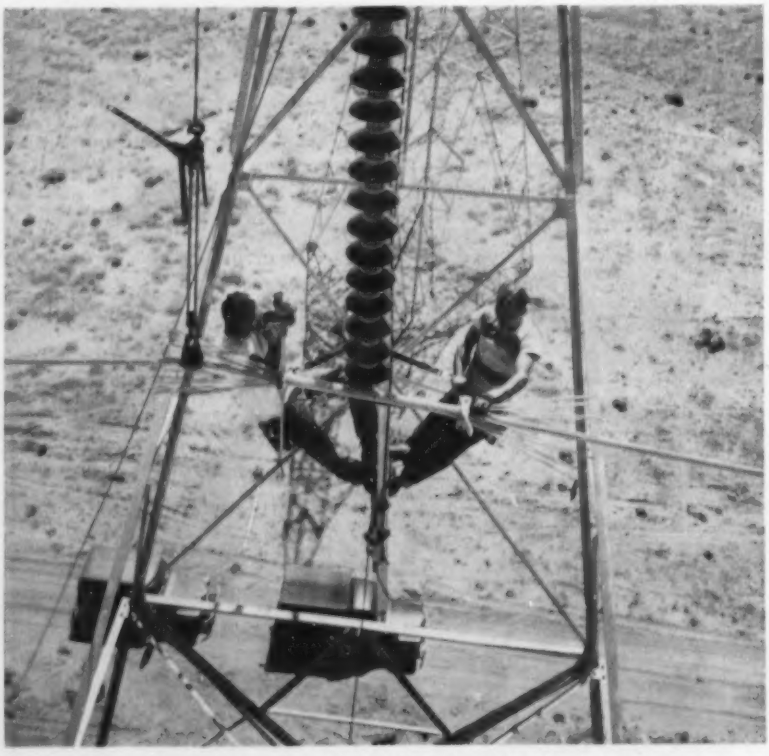
Eugene Water & Electric Board

Construction activities for 1954 included a continuation of changeover in fringe areas from 2,300- to 12,000-v primaries. In the central business district of the city six 500-kva underground transformers were installed. The voltage rating is 12,000/125/216. The primary cable is made up of three No. 4/0 neoprene rubber covered cables and copperweld neutral. The secondary cable is made up of three similar conductors of 300-MCM with a copperweld neutral.

The Bonneville Power Administration has installed a second 30/40-mva transformer for our use. This brings our Bonneville supply capacity to approximately 75,000 kw which supplements our own generating capacity of approximately 23,000 kw hydro and 31,000 kw steam. Peak load for the year was 67,800 kw. It occurred on Dec. 20, 1954, in the forenoon. This peak was higher than the 1953 peak by 24%. Energy output for the year 1954 was 11% higher than in 1953.

Because of delays in receipt of demand meters, their installation has not proceeded according to schedule. We had hoped to have approximately 1,500 demand meters installed for residential service involving space heating. Present plans call for approximately 100% installation of demand meters for small power and industrial customers. The estimated average expense of installing a residential demand meter is $50. We estimate that the capital investment savings that will result from a reduction of one kilowatt peak load will be approximately $300 in generation and a somewhat smaller figure in distribution. We believe that residential customers can be educated to control the peak. We also believe that the customer will use just as many kilowatt-hours at the lower peak as he would have used at the higher peak. Our rates are calculated to obtain this result. Residential demand charge for all-electric heating is 30c per kw and the end step is 8 mills.

An application for license to con-



Clipping-in on Bonneville Power Administration's first 345-kv line from McNary to Ross

struct a 30,000-kw hydro plant on the Upper McKenzie River is before the Federal Power Commission. We plan to continue our efforts to obtain Congressional approval of a partnership project on the South Fork of the McKenzie. This project would result in the development of approximately 35,000 kw of power in connection with a flood control and irrigation project known as the Cougar project.—*R. B. Boals, superintendent-secretary.*

McNary Dam Army Engineers

During 1954 construction work and installation of generating equipment continued on schedule at the McNary power and navigation project on the Columbia River. Highlight of the year was the dedication by President Eisenhower in September, at which time generator No. 5 was placed in service. Units 3 and 4 previously went on the line in April and June, respectively, and unit No. 6 in December, bringing the total power installation to 420,000 kw, or 483,000 kw at 15% overload capacity. Although rated at 70,000 kw, it is noteworthy that the first five generators have been operated continuously at the overload capacity of about 80,500 kw. In addition, the power house substructure and superstructure were substantially completed. Expenditures for power house turbines, generators, transformers, switchyard and appurtenant equipment totaled $24,486,000 during the year.

Aside from the power plant, work on the project was virtually finished, including completion of the dam and fishways and raising and revisions to the Northern Pacific Railroad bridge across the Columbia River at Pasco, Wash. Total expenditures for 1954 including the foregoing amounted to $28,660,000, the total actual project costs to Nov. 30, 1954, being $255,526,000, and $258,365,000 estimated as of Dec. 31, 1954. Total cost of the McNary project is estimated at $287,300,000.

During 1955 installation of generating equipment will continue to be expedited, with four additional units of 70,000 kw each scheduled to be placed in service. Generator No. 7 is scheduled for February and No. 10 for October 1955, making a total power installation of 700,000 kw available for the growing Northwest load. The remaining power units, including Nos. 11 to 14, are planned for 1956.

Pacific Power & Light

Merger of the Mountain States Power Co. with and into Pacific Power & Light Co. on May 21, 1954, created the third largest utility company on the Pacific Coast. The enlarged company's utility plant totals more than $181,000,000, annual revenue approximates $40,000,000; and customers served at year end included 265,000 electric, 12,500 water, 9,000 telephone and 1,000 steam heat.

The Pacific system now extends over large sections of Oregon, Washington and Wyoming and includes the Flathead Valley of Montana and the Sandpoint area in northern Idaho. Additions and improvements on the combined system during 1954 required expenditure of $11,500,000 in construction funds. Growth of the system was reflected by a 9% increase in use of electricity during the year.

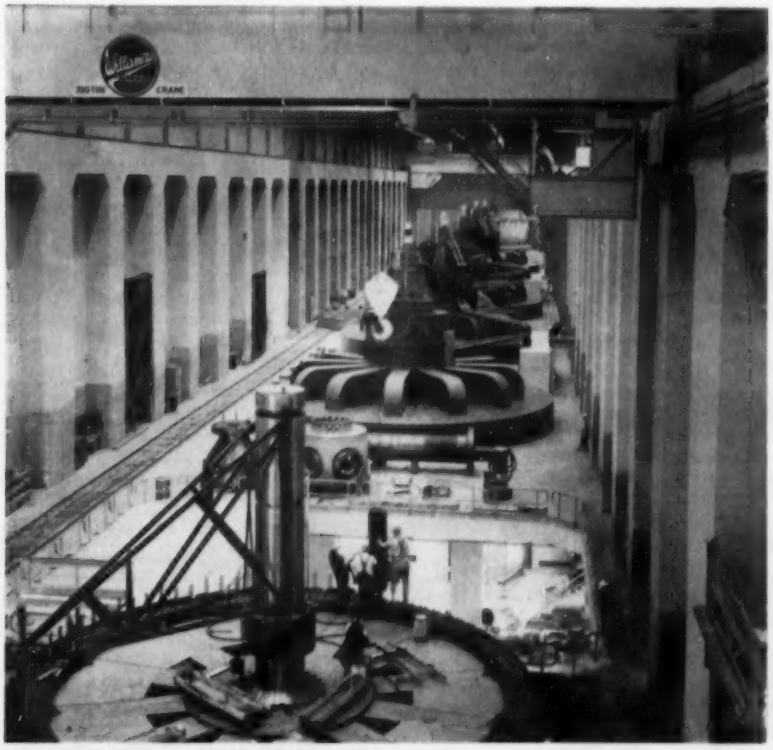
1954 Construction

Construction in 1954 was distributed generally throughout the system. It included approximately $9,000,000 for distribution plant, $1,600,000 for production and transmission and $1,000,000 for general plant.

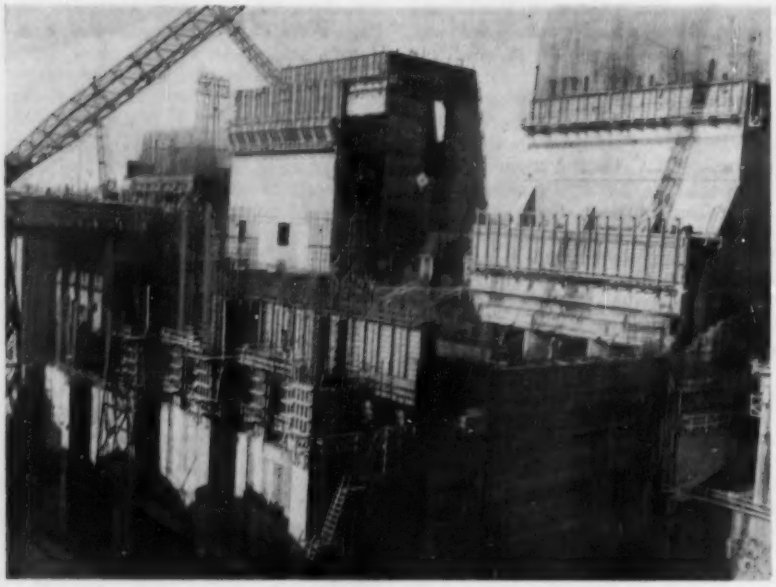
The year's construction program saw the start of a major power supply project to link areas served by the company in Clatsop, Tillamook and North Lincoln Counties on the northern Oregon coast by a 115-kv transmission line. Work on a 20-mile section of the circuit in Tillamook County, started in the fall, is scheduled for completion early in 1955. Work then is to start at the north end of the line. Approximately 13 miles of 57/115-kv line from Grand Ronde to Otis at the south end of the project was completed in December. Also completed was a 115-kv tie line between the company's River Road substation in Yakima, Wash., and Bonneville Power Administration facilities to reinforce service in that area.

Major substation additions were made in Portland, Bend and The Dalles, Ore., and in Walla Walla and Wapato, Wash. Although there were no major construction projects in the eastern portions of the system, a considerable sum was spent to build extensions to serve the ever increasing pumping loads in the 25 major oil and gas fields served by the company in Wyoming.

The 1955 construction program calls for expenditure of more than $12,000,000, with major increases in substation capacity scheduled in a number of locations, including Portland, Albany and The Dalles, Ore., Yakima and Toppenish, Wash., and Casper, Wyo. To be continued and extended are the distribution conversion programs in Portland and the Bend-Redmond section of central Oregon, Kalispell, Mont., and the Yakima Valley in Washington.—*F. Coleman Jones, general superintendent.*



McNary power house showing units Nos. 1 to 5, No. 6 being assembled—Army Engineers



Units 2 and 4 substructure (left), The Dalles project—Army Engineers. Right: Clearwater canal—California Oregon Power Co.

Portland District Army Engineers

The Portland District, Corps of Engineers, has four projects in operation or under construction that include power development, two of which are completed.

Bonneville Dam on the Columbia River, 42 miles east of Portland, has been producing power since 1938 and is fully installed with 10 generating units for a total of 518,400 kw.

Detroit project on the North Santiam River, 45 miles southeast of Salem, Ore., was completed during the year. The 18,000-kw unit at the Big Cliff reregulating dam, 2.8 miles downstream from the Detroit Dam, went on the line during June 1954. This brings the total generating capacity of the project up to 118,000 kw.

Lookout Point project on the Middle Fork Willamette River, 22 miles southeast of Eugene, Ore., is 94% complete. The reservoir is being operated for flood control purposes and the first of the three 40,000-kw units went on the line during December 1954. The remaining two 40,000-kw units at the main dam and the 15,000-kw unit at the Dexter reregulating dam 2.7 miles downstream are scheduled to go on the line during April and June 1955.

Construction of The Dalles project, located on the Columbia River three miles east of The Dalles, Ore., is 21% complete as a whole. Construction of the spillway dam, including approach channel excavation and installation of crest gates, is 70% complete. The power house substructure for the first 14 main units and appurtenances is 60% complete. Substructure for units 15 through 22, the east fish ladder and east nonoverflow dam is 24% complete. Construction of the navigation lock, north nonoverflow dam and fish ladder was initiated in September 1954.

Contracts for the design and fabrication of 14 main unit, two fish channel water supply, and two station service unit turbines and for eight 78,000-kw main unit generators and two fish channel water supply generators have been awarded. Manufacture of main and fishwater unit intake gates and appurtenances and miscellaneous electrical and mechanical equipment is also in progress under various contracts. Contract for construction of the power house superstructure for units 1-14 was awarded in December 1954. Relocations of railroads and highways for the project are now 30% complete. Power on the line from the first two main units is scheduled for November 1957.

Portland General Electric

Construction expenditures for the year 1955 are estimated to total $10,500,000, which is practically the same as the actual construction expenditures for the year 1954.

The 1954 December peak was 627,000 kw as compared with 568,000 kw for December 1953.

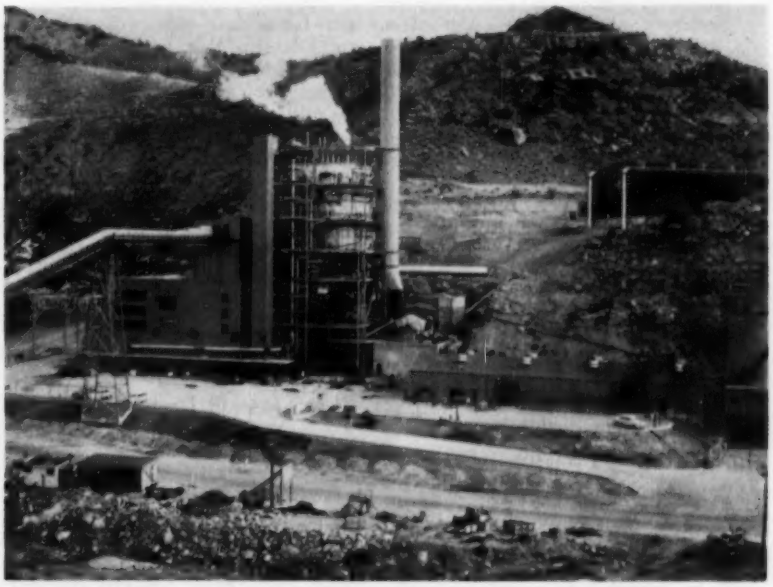
The company's Timothy Meadows project, which was started in 1954, involves the construction of reservoir with 60,000 acre-ft of useful storage on the Oak Grove Fork of the Clackamas River. This storage will supplement normal stream flow during low water season at station P, station G and station M. The following progress was made in 1954: (1) Construction of 12 miles of access road through the National Forest; (2) clearing 1,200 acres in the reservoir area; (3) preliminary construction on earth filled dam and installation of outlet structure; (4) installation of microwave system between station P and Timothy Meadows for communication and control. The Timothy Meadows project will be completed in 1955.

During 1954 the company completed the following new interconnections with the BPA system: 125-mva 57-kv tie at BPA Chemawa substation; 50-mva 115/57-kv tie at St. Helens; 33-mva 115/57-kv tie at Grand Ronde.

During 1954 the company constructed 12 miles of 115-kv 795-MCM ACSR transmission line between BPA's Oregon City substation and the company's Burlingame substation in southwest Portland. This line will be operated initially at 57 kv.

The company also completed its program for reconstruction of station G by replacing the old cast iron casings on five hydraulic turbines with new fabricated steel casings and installing new controllers for the turbines. The reconstruction program also involved the installation of new switching and control equipment.

The 1955 construction program includes the following important transmission lines: (1) Building a 115-kv 795-MCM ACSR line from BPA Bethany substation to station E; (2) rebuilding a portion of 57-kv line between Lents and Tabor substations with 795-MCM ACSR conductor; (3) building a 57-kv line from Glendoveer



Mouth-of-mine Carbon plant at Castle Gate—Utah Power & Light Co. Right: Sports lighting job—Telluride Power Co., Richfield, Utah

substation to Knott substation with 795-MCM ACSR conductor.

The distribution substation program for 1955 involves the construction of five new substations with a total capacity of 30,000 kva and the addition of 45,000 kva capacity in existing substations.

During the past eight years the company has carried on an aggressive program of raising the distribution voltage in all outlying areas from 2.4 kv, 4.16 kv and 7.2 kv to 12.47 kv. The 12.47 kv is now available in nearly all areas outside of Portland and Salem. The latter are served at 4.16 kv. The 1955 programs provide for additional cutovers to 12.47 kv and the installation of 12.47-kv ties between substations stepping down to 12.47 kv.

The 1955 construction program includes a new operating center for the Portland Division. This operating center will involve an expenditure amounting to $1,250,000.

Street lighting requirements for the City of Portland in 1955 and succeeding years will be materially accelerated by the results of the Nov. 2 election in which the voters endorsed an expenditure of $1,000,000 per year for the next 10 years for improved street lighting. The new street lighting measure becomes effective on July 1, 1955. It is also anticipated that new street lighting requirements will be accelerated in the outside divisions.

The radio network program for 1955 includes an important microwave link between Mt. Scott radio location and Bald Peak. This microwave link is required to improve communication in remote parts of the company's service area. The 1955 radio network program also includes a partial replacement of 75-mc mobile radio units with 48-mc equipment.

The automatic and supervisory control program for 1955 provides for the installation of the necessary automatic and supervisory control equipment to convert three manually operated substations to the nonattended type and to reduce the attendance required at two hydro plants.—*John Bankus, chief engineer.*

Utah

Telluride Power

During 1954 about $200,000 were spent for system additions and betterments and an expenditure of $650,000 is planned for 1955.

The system peak for 1954 was 18,483 kw, an increase of 2,343 kw over 1953. Planned for 1955 are about 100 miles of 44-kv transmission line and 4,500 kva in distribution substation capacity.—*Paul P. Ashworth, executive vice-president.*

Utah Power & Light

Utah Power & Light Co.'s annual construction expenditures reached an all-time high of over $24,000,000 in the year 1954. It was the largest year in the postwar construction program in which $100,000,000 has been spent to date. Largest single expenditure in 1954 was $8,440,000 on the Carbon steam-electric plant, where a 66,000-kw, 1,250-psig, 950 F preferred standard unit is located in the heart of the Utah coal fields at Castlegate, Utah. Carbon was turned over to the operating department in November 1954. An additional $8,585,000 was expended on construction of the Gadsby No. 3 100,000-kw unit located in Salt Lake City, which will be in service in June of 1955. Other expenditures included $300,000 for hydroelectric stations, $2,200,000 for transmission facilities, $4,500,000 for distribution lines and substations and $400,000 for general facilities.

Utah Power & Light Co. will spend an additional $18,000,000 for new facilities in the year 1955.

In 1955 an amount of $5,500,000 is budgeted for thermal-electric generating facilities, which includes the completion of the third section of the Gadsby plant with a 100,000 kw preferred standard unit, 1,450 psig, 1,000 F with 1,000 F reheat that will be the largest unit on the system. A 1,000-kw diesel unit will also be added to the company's isolated Vernal system during 1955.

Transmission line extensions and increases in transmission substation capacity are estimated to cost $5,800,000 in 1955. Total expenditure planned for transmission includes a total of 296 miles of line and an increase of 370,000 kva in substation transformer capacity.

Extension of distribution facilities to new customers and improvement of existing facilities in 1955, including 122 miles of distribution line and 30,000 kva of additional substation capacity, are estimated at $5,000,000.

Budgeted for other construction is

an amount of $1,700,000, which includes a $440,000 office building at Ogden, Utah, scheduled for completion in 1955.

The second 30,000-kw electric furnace of the Monsanto Chemical Co. for production of elemental phosphorus at Soda Springs, Idaho, commenced operation in November 1954. Utah Power & Light Co. supplies power to these furnaces with a total demand in excess of 60,000 kw, 90% of which is interruptible.

A new 100,000-kw, 1,450 psig, 1,000 F turbogenerator unit is under consideration. Load studies indicate this addition to generating capacity will be required in 1958 or 1959. Several sites are under consideration but locations are dependent upon results of engineering studies now being made.—*E. A. Hunter, assistant to vice-president.*

Washington

Chelan County PUD

The distribution system of Chelan District completed 17 miles of distribution line and installed one 1,000-kva distribution substation on the summit of Stevens Pass.

The production system acquired materials or placed orders for materials necessary for the construction of a 20,000-kva 115-kv substation and 14 miles of 115-kv transmission line. Substation and line will be constructed prior to July 1, 1955.

The distribution system plans on the construction of 17 miles of 33-kv subtransmission line, a 3,750/4,687-kva substation designated College substation and 20 miles of distribution line in 1955.

No new resources are under construction by the Chelan District at this time. The district is, however, working on possible new resources as follows:

Wenatchee Hydroelectric Project, FPC Project No. 2151—Chelan District was given a three-year preliminary permit effective July 1, 1954, in which to make preliminary studies of this project. Considerable field data have been obtained and studies are in progress. We have no proof of economic feasibility at this time but are optimistic in our belief that the project will be found economically feasible. The installed capacity may be slightly lower than that on which the preliminary permit was filed but, pending completion of studies, we will report the installed capacity of this project at 145,000 kw. Our best estimate now is that 67,500 kw would be available prior to Dec. 30, 1958, and 77,500 kw would be available during the fore part of 1959.

Rocky Reach Project, FPC Project No. 2145—Chelan District has been granted a three-year preliminary permit effective Aug. 1, 1954, for making preliminary studies on the Rocky Reach project. The district has begun its studies by making seismic survey of rock in a two-mile stretch of the river. Assuming normal schedule for preliminary studies and construction our best estimate is that 260,000 kw would be available in 1964 and 325,000 kw in 1965 with 195,000 kw available between January and June 30, 1965. The remaining 130,000 kw would be available between July 1 and Dec. 30, 1965. —*Kirby Billingsley, manager.*

Chief Joseph Dam Army Engineers

Plugging of the last six of the 24 sluices in the lower portion of the spillway of Chief Joseph Dam is virtually all that remains for completion of the main dam. Final concrete placement on top of this structure was made in November. All 19 tainter gates are in place and the roadway above is completed. Closing of the sluices has caused the reservoir, Rufus Woods Lake, to form and the Columbia River is lapping at the spillway crest for the first time. Chief Joseph Builders constructed a dike across the intake channel to keep the intake structure dry until ready for water this spring. Thus the main dam will be fully complete

Current and Future Development of USBR Power Projects

Project	State	River	Purpose*	Name of Plant	Year of Initial Operation	Present Kw	Present No. of Units	Ultimate Kw	Ultimate No. of Units
Boulder Canyon	Ariz.-Nev.	Colorado	I,P,FC	Hoover	1936	1,249,800	18	1,354,300	19
Eklutna	Alaska	Eklutna Lake Division	P	Eklutna	1955	15,000	1	30,000	2
Kendrick	Wyo.	North Platte	I,P	Alcova	1955	0	0	36,000	2
Central Valley	Calif.	American	P,FC	Folsom	1955	0	0	162,000	3
Central Valley	Calif.	American	P,FC	Nimbus	1955	0	0	13,500	2
Yakima	Wash.	Yakima	I,P	Chandler	1955	0	0	12,000	2
Palisades	Idaho	Snake	I,P	Palisades	1956	0	0	114,000	4
Weber Basin	Utah	Weber	I,P,FC	Gateway	1957	0	0	4,000	3
Weber Basin	Utah	Weber	I,P,FC	Wanship	1957	0	0	1,400	1
Mo. River Basin	Mont.	Marias	I,P,FC	Tiber	1958	0	0	2,000	3
Yakima	Wash.	Roza Canal	I,P	Roza	1958	0	0	11,250	2
Colo.-Big Thompson	Colo.	Trans. Mtn. Division	I,P	Big Thompson	1958	0	0	4,500	1
Collbran	Colo.	Bonham-Cottonwood Section—Mesa Pipeline	I,P	Molina	1959	0	0	5,500	1
Minidoka	Idaho	Snake	I,P	American Falls	1959	0	0	30,000	3
Mo. River Basin	Mont.	Big Horn	I,P,FC	Yellowtail	1960	0	0	200,000	4
Mo. River Basin	Wyo.	North Platte	I,P,FC	Glendo	1961	0	0	24,000	2
Collbran	Colo.	Mesa Pipe Line	I,P	Cameo	1960	0	0	2,500	1
Mo. River Basin	Wyo.	North Platte	I,P	Fremont Canyon	1961	0	0	48,000	2
Mo. River Basin	Wyo.	Clarks Fork	P,FC	Bald Ridge	1963	0	0	30,000	3
Mo. River Basin	Wyo.	Clarks Fork	P,FC	Thief Creek	1964	0	0	60,000	3
Mo. River Basin	Wyo.	Clarks Fork	P,FC	Hunter Mountain	1964	0	0	12,000	2
Mo. River Basin	Wyo.	South Fork Tongue	P,FC	Tongue River	1964	0	0	25,000	2
Mo. River Basin	Wyo.	Sunlight	P,FC	Sunlight	1964	0	0	20,000	2
Mo. River Basin	Mont.	Missouri	I,P	Little Porcupine	1970	0	0	18,000	3
Mo. River Basin	Mont.	Missouri	P,FC	Portage	1963	0	0	20,000	2
Mo. River Basin	Mont.	Fowder	I,P	Moorhead	1970	0	0	8,000	2
Mo. River Basin	Mont.	Marias River Division	I,P	Kenil	1963	0	0	1,600	2
Mo. River Basin	Mont.	Madison	P,FC	Lyon	1963	0	0	24,000	3
Mo. River Basin	Mont.	Yellowstone	P,FC	Absaroka	1964	0	0	50,000	3
Mo. River Basin	Mont.	Big Hole	P,FC	Reichle	1963	0	0	20,000	2
Mo. River Basin	S.D.	Mo. Oahe Canal	I,P	Pony Hills	1963	0	0	180,000	4
Mo. River Basin	Neb.	Republican	I,P,FC	Harlan County		0	0	1,200	1
Mo. River Basin	Neb.	Garrison Division	I,P	Lincoln Valley	1963	0	0	50,000	3
Mo. River Basin	N.D.	Cheyenne	I,P	Lonetree	1965	0	0	45,000	3
Central Valley	Calif.	Trinity River Division	I,P	Trinity	1963	0	0	90,000	4
Central Valley	Calif.	Trinity	I,P	Lewiston	1961	0	0	2,000	3
Central Valley	Calif.	Trinity	I,P	Tower House	1961	0	0	66,000	3
Central Valley	Calif.	Trinity River Division	I,P	Matheson	1961	0	0	75,000	3

* Abbreviations under Purpose: I—Irrigation P—Power FC—Flood Control

Note: Future power plants are subject to Congressional appropriation of funds for their construction.

Current and Future Power Transmission Lines on Bureau of Reclamation Projects

Project	State or States	Line Terminals		Rating in Kilovolts	Line Length in Miles	Construction Type	Estimated Year of Completion
		Terminal A	Terminal B				
Palisades	Idaho	Palisades power plant	Goshen (UP&L)	115	57	wood pole H frame	1956
Collbran	Colo.	Molina	Cameo	69	17	wood pole H frame	1959
Collbran	Colo.	Cameo	Public Service Co. of Colo.	69	1	wood pole H frame	1959
Mo. River Basin	Wyo.	Boysen	Pilot Butte	115	40	wood pole H frame	1958
Mo. River Basin	Wyo.	Pilot Butte	Lander	115	30	wood pole H frame	1959
Mo. River Basin	Wyo.-Mont.	Lovell	Yellowtail	115	46	wood pole H frame	1956
Mo. River Basin	S.D.	Gavins Point	Sioux Falls	115	90	wood pole H frame	1958
Mo. River Basin	S.D.	Gavins Point Tap	Gavins Point	115	8	wood pole H frame	1955
Mo. River Basin	S.D.-Neb.	Rapid City	Chadron	115	110	wood pole H frame	1958
Mo. River Basin	S.D.-Iowa	Fort Randall	Sioux City	230	138	steel tower	1955
Mo. River Basin	S.D.-Minn.	Big Bend	Granite Falls	230	216	steel tower	1956
Mo. River Basin	N.D.	Jamestown	Fargo	230	86	steel tower	1956
Mo. River Basin	N.D.-S.D.	Edgeley	Groton	115	85	wood pole H frame	1956
Mo. River Basin	N.D.	Lakota	Grand Forks	115	61	wood pole H frame	1958
Mo. River Basin	N.D.	Grand Forks	Fargo	115	80	wood pole H frame	1957
Mo. River Basin	Mont.-N.D.	Dawson	Bismarck	230	208	steel tower	1959
Mo. River Basin	Mont.	Miles City	Yellowtail	115	142	wood pole H frame	1960
Mo. River Basin	Mont.-Wyo.	Yellowtail	Ucross	115	95	wood pole H frame	1960
Mo. River Basin	Wyo.	Ucross	Buffalo	115	18	wood pole H frame	1960
Mo. River Basin	Mont.	Yellowtail	Billings	115	44	wood pole H frame	1960
Mo. River Basin	Mont.	Fort Peck	Dawson	230	130	steel tower	1959
Mo. River Basin	S.D.-Neb.	Gavins Point	Belden	115	34	wood pole H frame	1955
Mo. River Basin	S.D.-Neb.	Fort Randall	Grand Island	230	155	steel tower	1959
Mo. River Basin	Wyo.-Neb.	Alcova	Gering	115	206	wood pole H frame	1957
Mo. River Basin	Wyo.	Alcova	Fremont	115	15	wood pole H frame	1957

early in 1955, several months ahead of the contract-scheduled date.

The intake structure concrete work is completed except for finishing the few remaining penstock elbow encasements. All of the first 16 penstocks have been installed. In the power house, installation of generating unit No. 12 is almost complete; work is advancing well on units 11 and 10; turbine and scrollcase assembly and placement for the next five units are under way. Other interior work is keeping pace. The first generator will be ready for testing this spring and the first three units are expected to be on the line on schedule by Sept. 1, 1955.

Other work in connection with the project includes excavation of the tailrace berm and channel and construction by Bonneville Power Administration of the switchyard on the hillside west of Foster Creek.

Clark County PUD

The Clark County Public Utility District added 10,500 kva of distribution transformers to the system to accommodate both increased loads and new customers and 20 miles of new lines were connected to the system. Fifty-six miles of line were converted to higher voltage.

A total of 1,950 poles was set and approximately 1,000 new services were run. Total number of customers at the end of the year was 29,850. The district added 25 irrigation customers totaling 463 hp. Five regulators were installed on the system.

Plans for 1955 stipulate the installation of a new substation in the center of the county. Conversion from 2,400 v to 7.2/12-45 kv will continue at the rate of 50 miles per year. Regulators and automatic sectionalizing equipment are to be installed at various locations on the county-wide system.—*F. H. Lehman, chief engineer.*

Cowlitz County PUD

During the year 1954 the district, in keeping with its established program, continued the work of system improvement and strengthening in order that load growth throughout the county may be adequately served. The 1954 schedule was confined almost entirely to transmission and distribution with emphasis on the latter.

Generating plant improvements were not extensive, being confined largely to the installation of a new closed-type air cooler for one generator at a cost of approximately $5,500.

The 69-kv transmission system was extended for a distance of approximately three miles largely within the city of Longview. This extension is a further step toward the objective of a 69-kv loop around the Kelso-Longview area. The portion constructed in 1954 extends from the new Washington Way substation to 14th and Beech, leaving a similar length of line as all that remains to be erected in order to complete the loop.

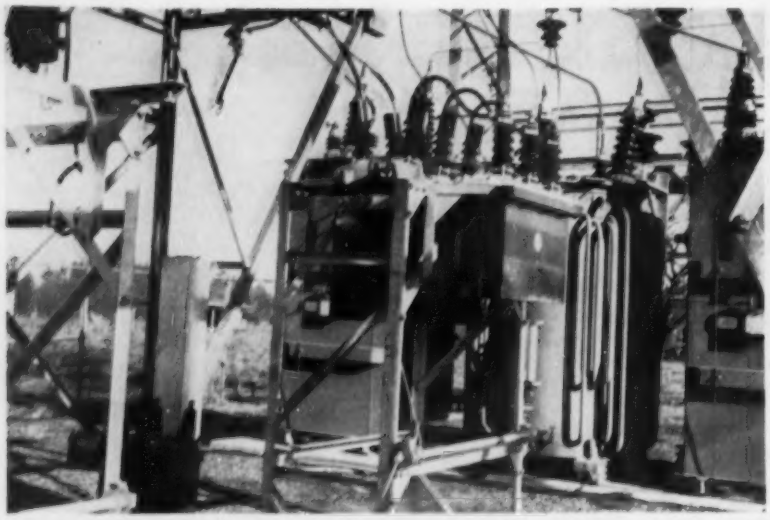
Distribution substation enlargements were made at the Olive Way station where capacity was increased from 5,000 to 10,000 kva; at the Castle Rock station where the increase was from 3,000 to 5,000 kva; at the East Kelso station where the increase was from 4,500 to 7,000 kva; and at the West Kelso station where the increase was from 8,000 to 10,000 kva. In addition to distribution substation capacity increases, the transformer capacity of the interconnection between the district's 13.2-kv system and its 69-kv system was increased from 6,000 to 14,000 kva.

Distribution extensions and improvements in the approximate amount of $600,000 were accomplished. The largest single project in this classification was the distribution reconstruction in the business section of Kelso where poles and conductors were replaced and, to a great extent, removed from the main streets to the alleys and side streets. Other distribution improvements consisted generally of conversion to 12.5-kv wye, pole replacement and the new extensions and additions required to meet the increasing demands for service.

Two parcels of land were acquired for use as future substation sites, one of these being on Ocean Beach highway at 20th St. and the other on Third St. in southeast Longview. The site on Third St. will be primarily a transmission switching station while the site on Ocean Beach is for another distribution substation. Other than these, no important changes or additions to general property and buildings were accomplished.

The program for 1955 will be similar to that of the past three years, namely a continuation of the project of increasing and strengthening the distribution and transmission system. The 69-kv transmission loop around the Kelso-Longview area is planned for completion during the year. It is expected that about 20,000 kva of distribution substation capacity and approximately 30 miles of additional distribution lines will be added. Conversion to higher distribution voltage will be carried forward but at a less rapid rate since all of the rural area and much of the urban area is now converted.

No changes are planned for the generating plant. Further consideration will be given to enlargement of the general office in Longview but final decisions in this respect have not yet been reached.—*O. G. Hittle, manager.*



Left: Clark County PUD reclosure installation. Right: Kelso's main street before Cowlitz PUD reconstructed its distribution lines

Priest Rapids Dam Army Engineers

Seattle District of the Corps of Engineers is cooperating with Grant County PUD in outlining studies required to establish the Priest Rapids project plan, basic data, limits of studies and specific assumptions. Navigation and power studies and the development of several possible dam layouts are continuing. The Federal Power Commission has granted the PUD a temporary permit for establishing feasibility of the project and that organization's ability to finance the construction. The PUD was successful in its fight to keep the Washington State Power Commission out of the Priest Rapids field until or unless the PUD is found to be unable to handle the project alone. The last session of Congress deauthorized Priest Rapids Dam for federal construction.

Puget Sound Power & Light

During the year 1954 a new transmission substation was constructed at Eastside near Kirkland, Wash. Present capacity of this station is 40,000 kva, 110/55 kv. The station capacity can be doubled when load growth justifies the increase. Thirteen new distribution substations with a combined capacity of 34,250 kva were constructed and placed in operation during the year. Transformer capacity in 17 existing substations was increased a total of 34,750 kva and one substation was decreased 13,500 kva. Net additions of transformer capacity during the year were 95,500 kva. Total plant expenditures for the year 1954 were $6,500,000, of which $375,000 were for production, $900,000 for transmission, $4,875,000 for distribution and $350,000 for miscellaneous plant additions and replacements.

In 1955 Puget plans to build 23 miles of new 110-kv transmission line and construct a new 110/55-kv switching station near Anacortes, Wash. Seven new distribution substations with a total capacity of 24,000 kva will be built in 1955 and the capacity of ten substations will be increased by a total of 21,000 kva.

Total plant expenditures for 1955 are estimated at $7,000,000, of which $200,000 are for production plant improvements, $1,000,000 for transmission plant, $5,450,000 for distribution plant additions and improvements and $350,000 for miscellaneous plant additions and replacements.—*Frank McLaughlin, president.*

Seattle City Light

The following statement is presented outlining the construction activities of the Lighting Department during 1954 and those planned for 1955.

1954 Program

During the year 1954 the total expenditures for additions to electric plant amounted to $11,955,000. The initial phase of the Ross power plant construction was completed in 1954. This work, along with some preliminary investigation work for the new dam for the Gorge plant, accounted for a total expenditure of $7,000,000. During the year expenditures on new transmission plant amounted to $1,202,000; distribution plant, $3,100,000; general plant, $650,000.

The third unit at the Ross hydro plant was completed and placed on the line Jan. 17, 1954. Clean-up work and installation of some of the auxiliary facilities at the power plant were finished, which completed the main construction contract on the plant. During the year contracts were awarded for the fourth and final turbine and generator unit for this plant with delivery of the equipment scheduled for the first half of 1956.

A contract was awarded to the combine of Merritt-Chapman & Scott Corp. of New York City and the Savin Construction Corp. of East Hartford, Conn., for construction of a new dam at the intake of the existing Gorge power plant. This dam will increase the head on the Gorge plant from 292 to 380 ft. This work will complete the installation at the Gorge plant, which was planned as the ultimate development more than 30 years ago. The contract was awarded on the basis of a bid of $14,735,000 which, after adding state sales tax, will amount to $15,177,000. The contract also calls for construction of a highway between the Gorge and Diablo plants required because of the flooding of the existing road.

The new Shoreline transmission receiving substation was completed during the year with an initial installed transformation capacity of 125,000 kva. This station is located in the north end of the service area and will relieve some of the load on the existing North and Canal receiving stations.

Distribution substation capacity of 53,500 kva was installed during the year, along with a nominal amount of primary and secondary distribution circuits.

1955 Proposed Program

Plans for the expansion of plant in 1955 call for a start on the construction of the Gorge high dam and the

Chief Joseph Dam and power house on the Columbia is a major project of Army Engineers

highway interconnecting the Gorge and Diablo power plants. It is estimated that the expenditures in connection with this work will be approximately $3,500,000 during 1955. The dam will be an arch-type concrete section with a gravity section serving as an abutment for the arch section on the left bank of the river. The spillway and auxiliary outlets will be located in the gravity section. It will be approximately 275 ft in height from the lowest point of excavation to the roadway on the crest of the dam.

Plans for construction of transmission plant include 2.4 miles of 230-kv double-circuit steel-tower line connecting the new Duwamish receiving substation with the existing transmission circuits from the Skagit project. It is also planned to install 7.5 miles of 115-kv double-circuit steel-tower line from the Bothell receiving station to the north end of the service area. Along with this construction there will be 18.2 miles of 115-kv single-circuit wood-pole line. These transmission facilities are estimated to require an expenditure of $726,000.

The new Duwamish receiving substation located in the south industrial section of the city is scheduled for initial operation in November 1955. Grading and preparation of the site are now almost complete. The initial installation will consist of a transformation capacity of 250,000 kva.

Installation of distribution facilities during 1955 will require about 25,600 kva of new distribution substation capacity along with approximately normal amount of distribution extensions.

Total expenditures estimated for new construction during 1955 will amount to $12,401,000 of which $6,000,000 will be spent on new hydro facilities; $3,216,000 on transmission facilities; $2,885,000 on distribution plant; $300,000 on general plant facilities.—*I. L. Cotton, assistant superintendent.*

Snohomish County PUD

Continued industrial and population growth in Snohomish County makes increased demands for electric service and the necessity for additional facilities.

During 1954 $2,570,000 were expended for improvements to utility plant. Budgeted for the year 1955 are $2,385,000. During March 1954, work was started on the construction of a modern service headquarters building, storeroom and garage to cost approximately $650,000. Work will be completed in the spring of 1955. A preliminary survey of a modern office building to be constructed on the same property will be made in 1955 ultimately making an all-purpose electric center.

The district completed construction of a 30,000-kva, 110/12-kv substation to serve expanded facilities of the Scott Paper Co. in Everett in 1954. Also constructed was a 7,500-kva, 55/4-kv substation near Edmonds and increased capacity of the 110/12-kv substation serving the Marysville area from 5,000 to 10,000 kva.

Plans for 1955 include the construction of a 5,000-kva, 55/12-kv substation near Stanwood, together with a 55-kv line from Arlington to Stanwood and a 15,000-kva, 110/55-kv substation at Arlington for serving the Stanwood area and other areas in the future. Also included in the 1955 plans is a 7,500-kva, 55/4-kv substation near Mountlake Terrace.

The system peak for 1954 was 130,000 kw, up 29,000 kw, or 12.9%, over the 1953 peak.—*A. S. J. Steele, manager.*

Tacoma City Light

Foremost in the minds of executives and engineers as we wind up the year 1954 is the program that is under way for development of additional self-generation, also the plans for participation in joint studies for other hydro and nuclear plants. Authorization received about midyear to proceed with the arrangements for financing and construction of the $146,000,000 Cowlitz River development, also for a $22,500,000 development on the south fork of the Skokomish River, has stimulated an unusual amount of activity.

Completion this year of the Utilities Administration building, also the light division shops, garage and warehouse, has made possible the consolidation under one roof of executive, administrative, engineering, operating and construction services.

Installation of a second 25,000-kw steam turbo-electric generator at steam plant No. 2 in Tacoma is nearing completion and was to be available for service in December 1954. The entire project, which included the addition of water walls in two present boilers, was estimated to cost $2,390,000.

Clearing away of the debris in Alder Lake got under way early in the year. This work will be carried on for another two years or more under contract with one of the local logging companies at a contract cost of $227,000.

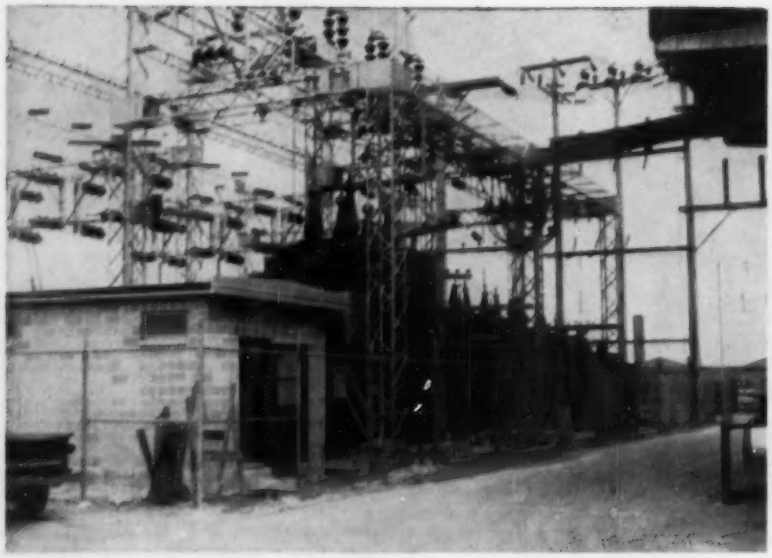
Major projects scheduled for 1955 in addition to those previously mentioned include the construction of four distribution substations at a cost of approximately $346,000; the replacing, at an estimated cost of $365,000, of a 42,000-kva transformer bank with a 100,000-kva bank, including oil circuit breakers, disconnect switches and other appurtenances at one of the major substations; also the construction of four miles of 52.5-kv transmission lines and the reconductoring of four miles, at a total cost of $140,000.—*H. A. Cole, superintendent.*

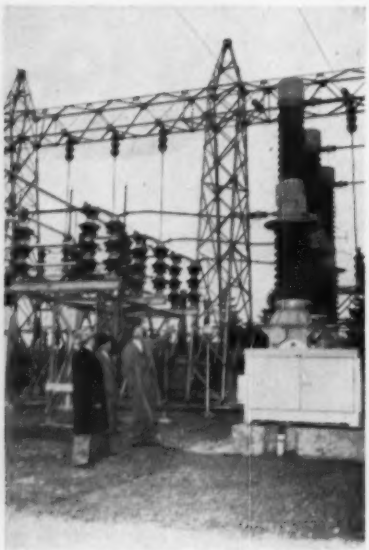
Washington Water Power

The Washington Water Power Co. plans to spend $10,278,000 for new and improved facilities in 1955, or $4,378,000 more than 1954 expenditures.

Major items this year include a proposed 230-kv transmission line from Spokane to the Waneta plant of the Consolidated Mining Co. of Canada that would cost about $3,652,000 and construction of a service center in Spokane at an estimated cost of $2,029,500.

WWP spent $5,900,000 last year in





Scott Paper Co. substation (left) of Snohomish PUD. Right: Minimum-oil circuit breakers, Shoreline substation, Seattle City Light

its system-wide construction program. Over a million dollars of this went for a pair of transmission line projects. Larger of the two was the strengthening of the southern portion of the company's transmission grid through installation of a 110-kv circuit from Lewiston to Nez Perce, Idaho. That work included the building of 28 miles of new line, the reframing and reinsulating of nine miles of existing 60-kv line to carry 110 kv and reinsulating another 12 miles.

In Spokane, the company built a 230-kv circuit between the WWP Beacon substation and switching center and the Bonneville Power Administration's Bell substation at Mead. The six-mile line forms the major tie between the two power suppliers and augments three existing 110-kv ties.

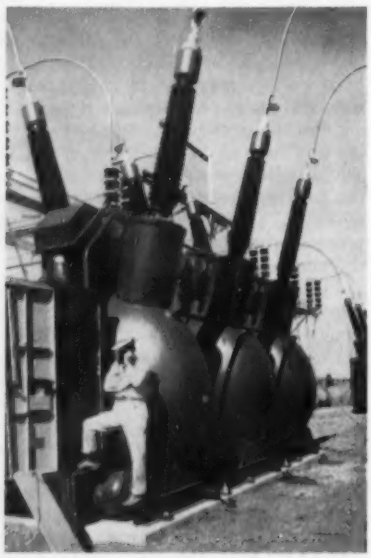
The company also completed a 110-kv transmission loop around the city of Spokane with another five miles of line between the Greenwood switching station and the Sunset substation.

About 85 miles of new rural lines were built, including sections in the Columbia Basin area. Twenty-five miles were built on the North Fork of the Clearwater River near Orofino, Idaho.

Throughout the system, WWP increased distribution substation transformer capacity by 42,250 kva.

The company cleared and prepared the building site for its new Ross Park service center and planned a construction start early in 1955. It will combine all of the Spokane division operations except the general office building, eliminating some 14 separate locations now in use, and effect substantial savings.

In 1954 the company completed exploration of the Noxon Rapids Dam site in Sanders County, Mont., and in December filed with the Federal Power Commission for permission to build and operate a new $87,000,000 power plant at that Clark Fork River site, 24 miles upstream from the recently completed Cabinet Gorge plant. WWP hopes to start construction in July, with the first power to be produced in 1959 from the 385,000-kw plant.



Cabinet Gorge plant (left) and Beacon sub breakers (right) of Washington Water Power

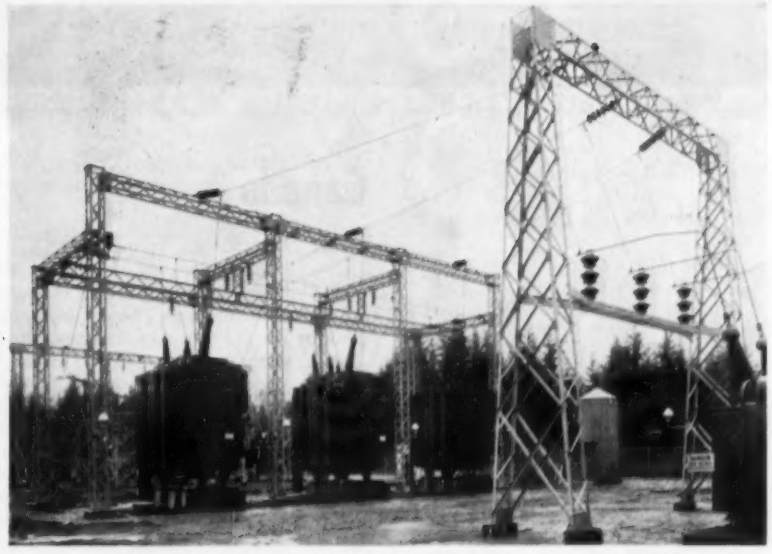
In its ten-million-dollar budget for 1955, the company lists the addition of 50,000 kva of distribution substation transformer capacity and 41,600 kva of substation transformer capacity on the transmission side. Some 80 miles of rural lines are planned and 20 miles of 13-kv circuits will be rebuilt.

WWP plans to build 27½ miles of 110-kv transmission line, with 17 miles of it completing a loop from Moscow to Orofino. That section would be built between Orofino and Nez Perce. The other 10½ miles would extend to Medical Lake a line now terminating at Garden Springs, just west of Spokane.

Three new substations will be built and additions made at eight others, including the doubling of capacity at two major Spokane substations.

Major work in the company's power

Ross Dam and power house (left)—Seattle City Light. Right: Tacoma City Light occupies its ultramodern new headquarters building



New Eastside 40,000-kva substation of Puget Sound Power & Light Co. at Kirkland, Wash.

plants calls for the rewinding of two generator units in the Lewiston plant, rebuilding headgates at Nine Mile and rehabilitation of circuit breakers at Long Lake.

Additions to the terminal facilities of the company's 110-kv circuit between Sandpoint and Cabinet Gorge will also be made to provide for a tie at Newport for the Albeni Falls plant when it goes on the line this year. Transformer additions to be made by WWP at Cabinet Gorge will provide a two-way feed for Sandpoint, and also make possible a double outlet for Albeni Falls power into the Northwest Power Pool grid.

The 100-mile-long Waneta line, proposed for building when all approvals are received, would integrate the operations of the Canadian firm's hydro generating facilities with those of WWP and other members of the pool and would add about 125,000 kw of firm power.

Yakima Project, USBR

Construction of the Chandler power and pumping plant was about 60% completed at year's end. The plant is a feature of the project's Kennewick division in the Kennewick-Pasco-Richland area. The installation comprises two 6,000-kw generating units and a turbine-driven pumping plant having an initial two and ultimate three 167-cfs units.

The plant is to be placed in operation by September of this year. Completed during 1954 was the plant's associated Chandler power canal, eight miles long.

Wyoming

Missouri River Basin Project, USBR

See report under Montana.

Alaska

Eklutna Project, USBR

Construction of the 4½-mile-long Eklutna tunnel, Eklutna power plant and alterations to the existing Eklutna Dam were completed by the end of 1954. The first 15,000-kw unit of the 30,000-kw-capacity power plant was placed in operation in January. The second unit is planned to go on the line in February. All work on the Anchorage substation was completed in November 1954 and the substation was energized at 115 kv. The final transmission line connections were made to the switchyard, also in November, and the Anchorage-Eklutna-Palmer transmission line was energized at 115 kv.

Hawaii

Hawaiian Electric

Major project in 1954 was the completion of the new generating station at Ala Moana and Alakea Street. Designated as Honolulu unit No. 8, this generating station was scheduled for completion in March 1955. In June of this year it was decided that load growth was such that it would be advantageous to complete the generating station this year. Deliveries were such that this appeared feasible, so construction was rescheduled to provide for completion in December. This generating station is one of our most successful projects. The building, with the high, smooth panels of concrete, divided by aluminum louvers the height of the building, presents a striking and attractive appearance. Of greater importance is the operation of the boiler, turbine and accessory equipment. The boiler, with its many complicated controls, functioned as designed and provided its guaranteed rated output of steam, closely regulated as to temperature and pressure. All accessory equipment operated smoothly and turbine came up to speed with no vibration and was synchronized for commercial operation on Dec. 17. Although rated at 40,000 kw, with a capability of 50,000 kw, on a test run it was found capable of generating 57,500 kw continuously.

Several features at this generating station are new for us. The steam conditions of 1,250 psi and 950 F are higher than have been previously used. To reduce manpower requirements many automatic and labor-saving devices are installed, including automatic soot blowers, closed-circuit television for viewing the interior of the furnace and magnetic amplifier voltage regulation equipment on the generator excitation system.

To carry the power from the new generating station to the transmission system 30,000 ft of gas-filled 44,000-v cable were installed from the plant to Iwilei and School Street substations. These 44,000-v cables were our first installation of this type. Electronic rectifying equipment, capable of producing 140,000 v, was purchased to test both cable and splices.

Eight hundred forty feet of existing duct line and 12 manholes on Beretania Street were rebuilt to make existing facilities adequate for 44,000-v cables to be installed in 1955.

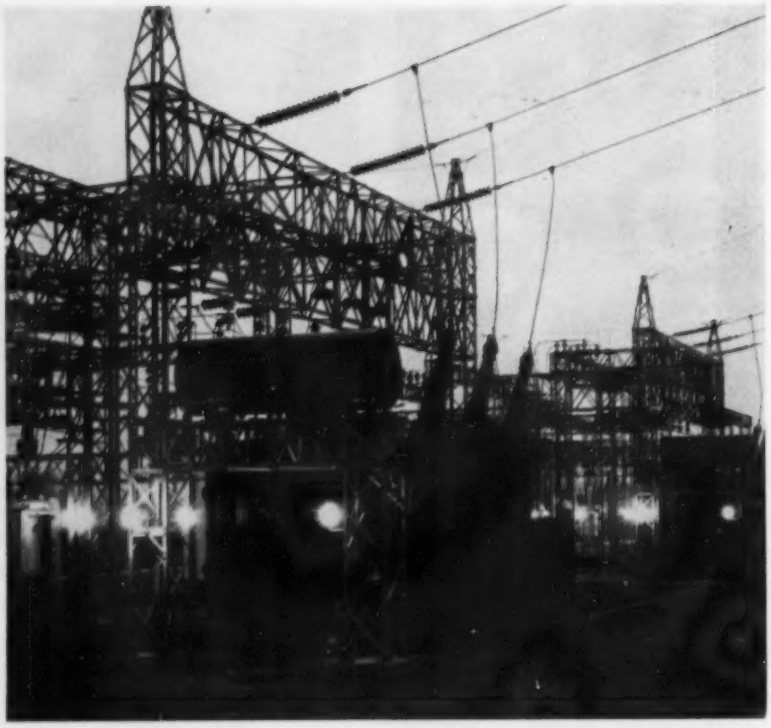
A total of 2.5 miles of new 44,000-v line was added to the transmission system. Of this amount, 1.2 miles in the Kaimuki area were converted from 11,000 v; 4.25 miles of 44,000-v line were relocated because of newly cultivated fields, highway projects or housing areas; 3.33 miles of 11,000-v line were relocated to remove the line from cultivated fields.

Three and six-tenths miles of overhead ground wire were installed on the double-circuit Iwilei-Koolau, Waiau-Koolau 44,000-v lines, completing the ground wire installation from Waiau to Koolau.

Total distribution substation capacity was increased by 19,525 kva. A new substation was added in Kalihi Valley. The capacity of Kapiolani, Kaneohe, Kailua, Kapaa, Makiki, Puohala, Pearl City, Halawa, Aiea and Kahala substations was increased.

Other construction included 36 new and rebuilt transformer vaults, underground distribution systems for four subdivisions totaling 110 homesites and overhead systems for 22 subdivisions totaling 1,444 homesites. Approximately 12,170 kva in distribution substation transformer capacity were added during the past year.

Included in the $3,797,000 budgeted for 1955 is the completion of the carrier current relaying of the major transmission lines and supervisory control of Koolau substation, the installation of 12,500 ft of 44-kv gas-filled cable, the construction of three new distribution substations and the increase in capacity of eight existing distribution substations.— *L. W. Lengnick, vice-president and executive engineer.*



British Columbia Electric Co. installs third 66,000-kva bank at Horne Payne substation

Canada

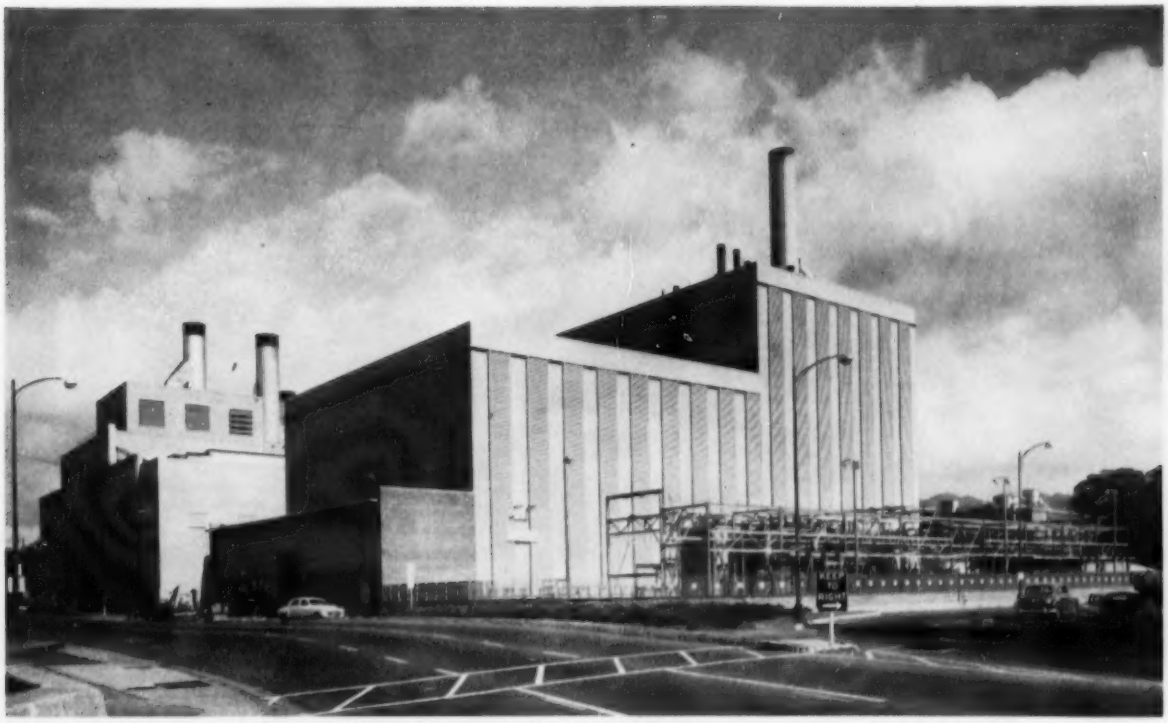
B. C. Electric

B. C. Electric Co., during 1954 spent $27,500,000 on new plant to keep abreast of and provide for continued load growth in Vancouver Mainland area. System peak for December 1954 was up to 430,900 kw compared with 384,200 kw for December of 1953, not including energy exported to the Northwest Power Pool. The peak for this system for the year occurred in November, however, and was 432,500 kw exclusive of export. Energy generated for system use during the year was up 12% above 1953.

In July of 1954 the fourth 45,000-kw generating unit at Bridge River was placed in service, together with the second 30-mva synchronous condenser and the third 66-mva transformer at Horne-Payne substation.

The construction for a 42,000-kw generating unit at Seton Creek near Lillooet is now well advanced with completion scheduled for 1956.

Satisfactory preliminary investigations for the two-unit 140,000-kw development at Cheakamus, north of Squamish, was completed in 1954 and a tunnel contract let, late in December. The first unit is scheduled for operation in 1957 and the second by the fall of 1958. This project will make available to the system resources from



Honolulu No. 8 plant with its smooth concrete panels divided by aluminum louvers was completed by Hawaiian Electric Co. in 1954

a new and separate watershed, appropriate for peaking and energy capabilities.

The Ashcroft electric system, purchased in 1953, was connected to a new 58-mile 60-kv transmission line from Lillooet by a 3,000-kva, 60/12/-6.9-kv substation. A 1,000 kva, 60/12/-6.9-kv substation was also connected to this transmission line at Carquille to serve new distribution in that area.

New Substation

In the Vancouver metropolitan area, a fourth 15/20-mva transformer was added a Kidd substation. Early in 1955 a start will be made on the George Dickie major ring substation to be located in the Kerrisdale district. This station is planned for service late in 1955 with two 25-mva 60/4-kv transformers. A third 25-mva unit will be put in service at Dal Grauer station in 1955.

Two additional 1,500-kw glass bulb mercury arc rectifiers were placed in service to supply transportation power and replace rotating equipment. This included the third unit at Haro substation and a unit in the new Joyce Road substation. A similar rectifier unit will replace the rotating equipment at Hastings East substation in 1955.

Two 60/4-kv substations were placed in service to supply the load growth in the West Vancouver area: John Lawson substation with two 6,000-kva transformers replacing West Vancouver substation and Hillcrest substation with one 6,000-kva transformer for the West Bay area. A second 6,000-kva transformer was added to Capilano substation for the Capilano area. These stations, including North Vancouver substation, have been connected to a 60-kv ring circuit originating at Horne-Payne substation. The ring was established by constructing 7.5 miles of new circuit and converting 8.2 miles of 34-kv circuit; 1955 will see the start of a 230/60-kv terminal station, which will supply the 60-kv requirements on the North Shore.

Cooperation Appreciated

ELECTRICAL WEST wishes to thank all the utility companies and agencies of the West, the Army Engineers, the U. S. Bureau of Reclamation, Bonneville Power Administration and the REA for responding so promptly and so completely to the request for data and pictures for this statistical and review issue. Returns this year were 100%, indicating the fine spirit of cooperation that exists in the electrical industry in the Far West.

In the Fraser Valley, Scott substation had its transformer capacity increased from 6 to 10 mva and a new 6-mva station was placed in service at Mission. Chilliwack substation will have its capacity increased from 6 to 10 mva, also Maple Ridge substation from 3 to 6 mva in 1955. A new 6,000-kva substation at Cloverdale is also planned for service in 1955, all of which reflects the general load growth in the Fraser Valley area.

Bay Street substation, on Vancouver Island, will have the fourth 20-mva transformer installed during 1955. This completes the transformer capacity presently planned for this station. To meet the continued load growth in the area, a substation with two 25-mva 60/12/6.9 kv transformers is planned in Saanich for completion in 1955.

Submarine Cable

Underwater surveys and selection of routes have been completed for the 132-kv interconnection between the Vancouver Island and Mainland systems. The sites for Delta substation on the Mainland and Stratford's Crossing substation on the Island, the respective terminals of this interconnection, have been located.

Many minor items are included in the 1955 planning for Vancouver Island and the Mainland which will progress our system.—*J. H. Steele, chief engineer, electrical division.*

Again in 1954 the San Diego Bureau of Home Appliances drew record crowds for its annual Electric and Home Appliance Show

Western Utilities Ready for

Teamwork is foundation of load-building programs

Judging by reports, 1955 is going to see a resurgence of load-building activity on the part of the electric utilities of the West. Since the war, many of these utilities have been busy building plant to keep pace with increased population and rapidly growing demand. Now that expansion programs are well under way, the need for intensive promotion of the use of electric appliances and equipment is generally felt.

The job is seen as one that calls for cooperation by the entire industry. Company sales plans are built with teamwork in mind. While the majority do not sell directly, practically all of them aid in promotion, cooperative advertising and in dealer training programs as well as with home service departments, kitchen planning and light conditioning services and similar helps.

Adequate wiring will be pushed in 1955. It is recognized as a neglected and necessary promotion if new equipment is to be put on the lines.

The accompanying letters from sales managers and briefs from sales reports indicate an optimistic outlook for business throughout the West. In making their reports, several of the companies sent their printed sales booklets for 1955. All were comprehensive, attractive in format and set up to show clearly what the individual company hopes to realize in additional load and how it is going to help dealers sell the necessary equipment.

All in all 1954 seems to have been a good year for most of the companies reporting, with increases in customers and kilowatt-hour use. Appliance shows were sponsored in many communities and never failed to draw good crowds and build up prospect lists. More are scheduled for 1955.

Again this year the tables of appliance sales, number and classes of customers, kilowatt-hour consumption per residential customer, etc., are being held for the March issue when final figures for 1954 will be available. In its January issue *Electrical Merchandising* publishes comprehensive national figures along these lines, together with estimates of sales in the territories of individual utilities based on the first three quarters of 1954. The figures to be published next month here will give final computations.

Arizona

Arizona Public Service

Our 1954 sales program produced nearly $4,500,000 in new business. We held 16 appliance shows throughout our system area featuring appliances with large potentials. We also built two model homes in Phoenix to give customers a more realistic display of appliances.

We expect 1955 to be the most competitive sales year in recent history but through a survey of Arizona business leaders last fall we found the outlook for this year to be generally optimistic.

Also typical of the interest throughout the 11 Western states in fairs and shows was the recent Sacramento Electrical Home Show

Competitive Selling Job

Business outlook reported favorable in this area

Our sales program for 1955 is designed to concentrate on our low-use customers and promote the sales of less widely used appliances.

Arizona's strategic location between the two fastest growing industrial states of the nation—Texas and California—will certainly continue during 1955 to be a large factor in attracting more diversified manufacturing industries to the state.—*Don Willis, general sales manager.*

Tucson GEL&P

We are quite optimistic about the 1955 business outlook for our service area. Indications point to a steady growth in population and a business condition that will require a steady and honest merchandising effort.

The company will not be an active merchandiser of appliances. This job will be done by local appliance dealers. Such merchandising activity will be coordinated primarily through the Tucson Appliance Merchandisers Assn. stressing honesty, service, satisfaction and dependability.

TAMA as an organization has as a main objective the accomplishment of sound merchandising through education and the exchange of ideas among the dealers.

Plans for getting under way in 1955 will be kicked off with a huge Appliance Festival at the County Fair Grounds on Jan. 27, 28, 29 and 30. Dealers and distributors will be amply represented from all indications as shown by the developed plans at this time (early January).

From this Appliance Festival it is hoped that the merchandising activity will receive impetus to carry it forward to greater accomplishment than has ever before been attained.

Adequate wiring will be stressed heavily throughout the year in order to educate the people to full service use for greater comfort and convenience.

Present planning calls for additional shows and demonstrations throughout 1955 to assure an aggressive merchandising job at all times.—*A. R. Seaman, commercial manager.*

California

Burbank PS Dept.

The year 1954 was a static year with sales steady, as recorded by the previous year. Sales of seasonal merchandise have been active. This is a good indication of a better year for the major appliances.

The economics within this area are definitely interwoven with the position of the aircraft, motion picture and TV industries. Any change there will immediately reflect the activity in Burbank.

Our promotional plans call for a continuation of our monthly classes in electric cooking and food freezing. These basic classes are being expanded to include demonstrations of the newer and smaller appliances such as rotis-

series, fry pans, etc. Increased emphasis will be placed on the display and promotion of air conditioning.

Meetings are to be held to further the interest of electrical contractors in adequate wiring work and the use of FHA Title 1 financing. Distribution of promotional material on adequate wiring to home owners will be stepped up considerably.

We will continue our participation in range wiring. We are firmly convinced that this appliance is the "foot in the door" to the use of other electrical appliances.—*H. E. McComas, customer relations agent.*

California Electric Power

Continued growth and development of Calectric's territory seems assured during 1955. Building starts in both residential and commercial classifications are expected to continue on about the 1954 basis. Our large industrial customers are making plant expansions and new small industries are moving in on us. Growth in agricultural sales will not be great and we expect to make only a moderate increase. Wholesale for resale into Mexicali continues to reflect the very substantial growth of that Mexican area.

During 1954, recognizing the fact that we must obtain our share of potential new business, we increased our sales promotion force considerably. In 1955 we may find it necessary to add a few more people to maintain this position.—*D. B. Wheelock, commercial vice-president.*

California-Pacific Utilities

In estimating the trend for 1955 we have reviewed the results of 1954 business activities in the company's service area. Following are facts in connection with the growth of our business:

1. Total number of customers served increased 1.4% compared to a 7.6% increase during 1953. This indicates a leveling off of the past rapid population growth because of new families moving into the communities we serve.

2. An increase of 8% in electric revenues last year compared with 12.5% increase during 1953 reflects the decrease in the rate of growth of the number of customers. An interesting proportion of this growth in the use of our service came from rural and commercial customers who generally express an optimistic viewpoint on farm income and business trends respectively.

3. Rate of growth of the average annual use of electricity by domestic customers decreased from 6.3% in 1953 to 2.8% in 1954. This was due largely to the fact that natural gas was made available to a substantial block of domestic customers who are taking advantage of the lower cost of this fuel for all household heating applications including space heating. The average annual use of electricity by domestic customers has, however, increased to 4,952 thereby further confirming the high general acceptance of electrical appliances in the homes of the rural communities served by the company.

Cooking shows like this one sponsored by California-Pacific Utilities Co. in its eastern Oregon territory were held to promote electric kitchens and as a customer service

4. The sale of major electrical appliances by appliance dealers on the company's service areas in 1954 decreased by approximately 15% compared to a 6% increase during 1953 over 1952. This might be explained by the fact that television came in for a good share of the customers' dollar in several communities where more major household appliances would normally have been purchased.

The above comparative data of 1953 and 1954 business activity in our part of the electrical industry, together with that of our electrical appliance dealer associates, enables us to make the following observations as to the 1955 trend of business activity in the electrical industry on our service area.

1. Rate of increase in electric revenues and the number of new customers are expected to level off to a normal rate of increase depending, of course, upon the probability of a lower rate of population growth for the rural communities of the Western states.

2. It is expected that with the present high saturation of electric appliances and a correspondingly higher number of replacement sales of appliances that the high rate of increase of the average annual use of electricity by domestic customers during the past five years will continue to be reduced in accordance with a lesser number of sales to new users of electrical appliances.

3. Electric appliance dealers in all parts of our service area having a substantial stock of appliances are already adding sales personnel, doing more advertising and generally increasing their sales efforts to maintain a satisfactory volume of business.

4. Electric appliance dealers are taking advantage of sales training materials and showing greater sales initiative by having their own special appliance shows and demonstrations. Appliance dealers are realizing the benefit of the company's cooperative appliance shows and demonstrations and are having more of their own individual shows and demonstrations. During the past years we have sponsored appliance shows in numerous communities, which have been very helpful in building dealer sales.

5. It is believed that the present trend of greater sales effort and better sales methods among electrical appliance dealers on our service area will result in 1955 sales of substantially the same number of electrical appliances as during 1954. Dollar volume may decrease somewhat because of the availability of more lower priced models for this highly competitive market.

6. The substantial rate of increase in use of electricity by our rural customers will continue as an increasing number of rural customers are utilizing electric power for irrigation purposes. Numerous sprinkler irrigation installations are planned for the 1955 growing season, which is requiring extensive construction of additional rural line facilities. The company's sales engineers are assisting rural customers and local dealers of irrigation pumps and equipment in laying out installations that result in customer satisfaction.

7. Commercial customers are be-

Display windows of Los Angeles Department of Water & Power supporting its electric dryer campaign increased dryer sales 50% over the same three-month period of 1953

coming better light conscious with numerous new lighting installations going in as the businessman realizes that good light helps sell goods. The example set by enterprising merchants and the chain stores, who have long realized the value of good lighting on display floor traffic and resulting increased sales, is now being followed by even the conservative merchant. We expect this trend of an increasing number of new commercial lighting installations to continue during 1955. Our sales engineers have prepared numerous lighting plans, which have been adopted by the customers and installed by cooperating wiring contractors.

8. More of the communities in the company's service area realize that good street lighting is a necessary civic improvement in accordance with examples set by neighboring communities as well as the safety requirements of present traffic conditions and are planning new street lighting installations during 1955. A number of new modern installations will undoubtedly be initiated during the year. Plans for a number of these installations are being developed by our engineering staff who have advised numerous of our municipalities on recent installations.

The company's substantial 1955 construction budget provides for new facilities that should amply care for a highly satisfactory rate of growth of system load as well as provide for spare capacity. All indications point to a continuation of the present substantial volume of business activity as reported by our field operating management, who foresees an improvement in sales results as our dealer-contractor 1955 sales promotional plans get under way. —*E. A. Nickelsen, commercial manager.*

Los Angeles Dept. of W&P

While we will continue our dealer support programs and activities this year, they will be directed principally to the new home market.

It is anticipated that 1955 will be a better year in the building industry than 1954; therefore, we believe that our emphasis on better wiring in the new construction field is timely and will prevent, to a great extent, further increase in the number of inadequately wired new homes.

We believe that the only logical approach to improved appliance sales must be through the creation of a potential market for the dealer. This can best be done by influencing the public to demand homes wired in accordance with the voluntary standards of the National Association of Home Builders, which recommend, among other things, a minimum of 100-amp service entrance equipment, and thus persuade the builder to wire his homes to meet the public demand.

Our recently completed electric clothes dryer campaign was quite successful with several distributors reporting that their sales were as much as 50% above those made in the similar period (October - November - December) in 1953.

We now have a full complement of manpower in our commercial-industrial sales organization and, with the current healthy business condition, we expect to continue our promotion in the commercial - industrial field substantially as during the past year but with increased effectiveness.

Utilizing typical lighting layouts for various kinds of businesses, we intend to make a special effort through our regular new-business representatives to show small- and medium-size establishments the advantages of using good lighting.

Sales presentations on behalf of all-electric kitchens will be made to all new restaurants and institutions, with continuing promotions of individual items such as fry kettles, griddles, etc., to existing customers. Cooperation with equipment-dealer salesmen will be strengthened.

In the industrial heating field, selective selling of the various specialized heat applications will continue to be emphasized.

Industrial development, which is a long-term operation, will be carried on as heretofore but with the additional acceleration resulting from several newly opened industrial subdivisions within our service area.—*R. H. Cockfield, business agent—power system.*

Modesto Irrigation District

The business outlook in the Modesto Irrigation District for the coming year is good. The load is continually increasing by approximately 10% per year. In addition to the increase in domestic load, there has likewise been an increase in the industrial and commercial loads. The new plant of the Marathon Paper Corp. will be completed shortly and will be in operation this year.

Sales promotion consists of advertising on all local radio stations and in the local newspapers. We look forward to the coming year with considerable enthusiasm.—*C. E. Plummer, chief engineer.*

Pacific Gas and Electric

The year 1955 will be "the year of opportunity" in California, according to the annual forecast of Pacific Gas and Electric Co. A stable pattern of economic activity is the national business outlook for 1955. In northern and central California, the outlook visualizes continuing growth and the prosperity and business opportunities that come with it.

Supporting the forecast are predictions of the trends in population and residential construction. Total residents in the 46-county PG and E service area are expected to reach 5,962,000 by the end of 1955—a gain of 155,000 and an increase of 2.7%. An estimated 63,600 new single-family homes are expected to be constructed in the 46 counties during 1955. This volume of residential construction will be near the record years of 1950 and 1951. New homes and modernization of existing dwellings are expected to be factors contributing to a 3.8% gain in the sales of nine major electric appliances during 1955.

An illustration and two pages from the comprehensive sales program and market outlook presentation made by Pacific Gas and Electric

During 1955 the company plans to carry forward vigorously its policy of full cooperation with dealers, contractors, wholesalers and manufacturers in the electrical industry and to do an aggressive promotional job designed to further the sale of electrical appliances and equipment, according to O. R. Doerr, vice-president in charge of sales.

Featured in the residential program are the following activities:

An adequate wiring promotion with these objectives: (1) to improve the quality of home wiring; (2) secure a maximum number of certified adequately wired new homes; (3) establish the recommended National Association of Home Builders' service entrance specifications as a minimum standard; (4) finally to increase the sale of electrical appliances and equipment through better wiring.

The plan of action includes: (1) an extensive advertising program promoting adequate wiring through the media of newspapers, bill inserts, direct mail and office displays; (2) participation in home shows, fairs, cooking schools, model homes, etc.; (3) work with FHA, VA, banks and other lending institutions, builders, contractors, architects, electrical contractors, etc.

Residential space heating, a promotion directed generally toward all-electric house heating but more specifically to new homes and to 240-v supplemental electric heat in existing homes. Company plans include: a system-wide advertising program utilizing newspapers, bill inserts, direct mail, poster boards, truck banners and displays in company offices; a training program for selected field personnel; and work with manufacturers, architects, engineers and established dealers.

Cooking school promotions, which have proved so successful during the past, are to be considerably expanded during 1955. Expansion of this program was prompted by the phenomenal attendance at the schools held in 1954, together with the enthusiastic support of the dealers who participated. Several of the schools were unable to accommodate the large numbers seeking admission.

California's gross farm income is the highest in the nation. The great diversity of California crops and the variety of equipment in use presents a multimillion-dollar market for new and replacement electric farm equipment and wiring. With this solid farm economy, the outlook for 1955 appears good even though there might be further adjustments in acreage and crop allocations. Items of special interest from a sales promotion viewpoint are hay dryers, sprinkler irrigation, dairy electric water heaters and livestock feed handling.

There is continuing need to reexamine methods of doing business, plans for the future and the changes taking place almost daily, the company believes. Industrial development will continue at a high level during 1955 due to the rapidly growing Western market that can be served best from West Coast plants. Programs are planned for 1955 to bring to the industrial customers the latest developments in electric utilization, such as industrial electric heat, rewiring, modernization and industrial lighting. Commercial customers will receive special emphasis on air conditioning, lighting and refrigeration.

The burgeoning population growth in northern and central California has created a tremendous demand for electricity essential to the standards of modern California living. The PG and E's expansion program will continue its unprecedented pace in 1955 and into the years ahead, it is promised.

Total estimated sales of nine major electric appliances during 1955 are expected to show a 3.8% gain over 1954. Sales of ranges and refrigerators will continue strong in 1955, favored by

ESTIMATED ELECTRIC APPLIANCE UNIT SALES

P. G. and E. Territory of Service

	Estimated 1955	Actual* 1954	% increase 1955/1954
Freezers	13,450	11,770	14.3
Ironers	5,100	4,280	19.2
Ranges	22,130	22,030	0.5
Refrigerators	69,410	67,610	2.7
Washing Machines:			
Automatic	69,100	67,760	2.0
Non-Automatic	22,040	20,470	7.7
Room Coolers	15,860	13,050	21.5
Room Air Conditioners	6,300	3,810	65.4
Television Sets	137,000	138,800	—1.3
Water Heaters	6,130	5,690	7.7
Laundry Dryers	20,450	17,480	17.0
TOTAL	**386,970**	**372,750**	**3.8**

*8 months actual, 4 months estimated.

large volume residential building. Clothes dryers will gain in popularity, with 1955 sales volume up 17% above 1954.

Room air conditioner sales will continue to show a sharp uptrend. While sales of this appliance have tended to be seasonal, the comfort factor of year-round air conditioning is now well established and should raise off-season sales.

Sale of a second television set in each home will be strongly emphasized during 1955. Replacement sales in those areas with high rates of television saturation will continue to be an important sales medium.

More new TV stations will go into operation in 1955, again offering opportunities for television set sales in previously unserved areas.

Pasadena L&P Dept.

Pasadena Municipal Light & Power Department expects an increase in the sale of electric energy at the same rate of growth as we have had in the past five years. We will probably add 1,500 residential meters to our system during the year along with a sizable growth in our commercial and industrial areas. We expect considerable increase in our air conditioning load, electric dryers, electric ranges and water heaters.

The department is doing very little advertising and does not expect to do very much in the coming year. We plan to continue our range wiring policy whereby it costs the customer only $20.50 for an average installation. We expect to continue our present servicing policy on electric ranges and water heaters where the customer pays for parts only.

Pasadena is the shopping center of the San Gabriel Valley and plans are under way for many national merchandising organizations to build new stores in our city. Scientific precision-type industry is continually moving to our city.

A new 40,000-kw steam turbine will go into operation within a few weeks and contracts have been let for a second unit of the same size, which will be installed as soon as possible.—*F. V. Frey, supervisor customer service division.*

Sacramento MUD

Our 1955 load building program indicates that from a promotional standpoint we will undoubtedly have the most active year in our history. Our major activities during the year will feature:

Lighting — A bonus bulb offer, which we hope will stimulate the sale of light bulbs in this area.

Electric Range—Our third annual range contest is scheduled for the period March 16 through June 1. This event has been acclaimed Sacramento's most successful appliance promotion and we anticipate a bigger and better contest this year.

Electric Dryer — We have a fall campaign scheduled to stimulate the sale of this major appliance; however, final details have not been developed.

Home Wiring — Final plans have been completed for an advertising program that will tie in with the banks and electrical contractors to announce the new financing plans available to residents of our area.

Adequate Wiring—Negotiations are under way for a series of model homes in several of our new subdivisions. We are also planning active participation in the 1955 Parade of Homes in cooperation with the Associated Home Builders.

Home Show — Our annual spring home show has been scheduled and we are looking forward to an outstanding event. Our air conditioning promotion for 1955 will tie in with the home show through a contest open only to show visitors.

Other fields in which we will be active include: Sacramento County Fair, California State Fair, dealer appliance training programs and commercial wiring program, plus an accelerated farm and rural-domestic program and school home economic events.

Forecasts for 1955 in our service area indicate a great increase in home building activity, particularly in the subdivision field. Other phases of local business activity also indicate a top year ahead for 1955.—*R. L. Dunshee, manager, commercial department.*

Palo Alto Electric Dept.

In response to your query of Jan. 5, 1955, may I advise you that my Eniac got a short circuit trying to forecast our winter peak load, so I am now doing my forecasting by the traditional method —feet on the desk, a wise look on the face and rear end on the cushion.

From where I sit, business prospects for 1955 look awful damn good. The Stanford shopping center and the Stanford industrial development program are proving phenomenally successful. Over 50% of the new houses being built in this area are wired for electrical ranges and other heavy-duty equipment. Load increase was 12% last year and it will be about 14% this coming year. We take no credit for this, for we have no promotional plans and do not plan any. Why get ulcers?—*E. A. Heath, chief electrical engineer.*

San Diego G&E

San Diego is looking forward with confidence that 1955 will show a continuation of the healthy business atmosphere that was experienced in 1954 throughout most of southern California, notwithstanding the fact that certain phases of our local economy show signs of softening during the months ahead.

The aircraft industry, to which San Diego economy is closely related, has shown a drop in employment in recent months as a result of the lessening of tension in international affairs. Shipbuilding, which employs some 5,000 people locally, has also declined because of the unsettled condition of the fishing industry.

Navy civilian employment seems to have stabilized at a level approximately 5% below a year ago, while agricultural employment has gained 7% during the same period.

After several years of rapid expansion in the construction of new homes, the backlog of demand is being reduced and the building trades are expected to reach a stabilized plateau somewhat below 1954, but which should remain fairly constant during the year ahead.

All of these factors point to a healthy but unspectacular increase in number of electric customers served by San Diego Gas & Electric Co. Estimates indicate that the net increase in new electric customers for 1955 will be about 9,500 as compared to 11,800 in 1954.

Gross electric revenue at present rates for 1955 is expected to reach $26,786,000 as compared to $25,274,000 in 1954. The company has recently applied for increased electric rates which, if allowed by the Public Utilities Commission, will produce an estimated increase of $4,827,000 on an annual basis.

Our plans from the standpoint of sales promotion and advertising contemplate a continuation of cooperative selling through the Bureau of Home Appliances of San Diego County, with intensified efforts in certain fields which contribute most to load and revenue characteristics for the company.

Advertising expenditures for 1955 will be approximately $181,000, which represents .67 of 1% of gross revenue from the sale of electricity for the year. As in previous years, most of the advertising purchased will be over the name of the bureau.

An objective view of our business

for 1955 which must, of course, include appliance dealers, electrical contractors, distributors and manufacturers, indicates a normally healthy year, not a year of plenty with little effort, nor a year of depression, but one in which all elements of the industry must work together intelligently and earnestly to continue to progress in a highly competitive market.—*R. J. Phillips, vice-president in charge of sales.*

Southern California Edison

"This year — 1955 — marks our reentry into the field of active selling and sales promotion. And the sales program we contemplate is not just a program for one year. It is a selective, hard-hitting continuous effort." With this statement, President Harold Quinton introduces Southern California Edison's 1955 sales program.

Pointing out that since the war the company has been under unrelenting pressure trying to keep capacity ahead of the constantly growing demand, Quinton states that the company is now ready to go. By 1958, if everything holds to schedule, it will bring into operation approximately 600,000 more kilowatts of generating capacity and plant expansion will be continued in proper relationship with the growth and development of our service territory.

"One of the most regrettable circumstances we have experienced during these years just past has been the construction of thousands of new homes in our territory with inadequate wiring—a serious loss of business for us and a source of inconvenience and dissatisfaction with our customers. This, I think, is our greatest opportunity—a chance to do something about those homes which already have been built and certainly to do a great deal about the many thousands of homes still being and to be built."

Tailored to Conditions

In the 1955 sales booklet H. L. Moore, newly appointed general sales manager, states: "To secure the best results and maximum benefits to our company, any sales program must be tailored to existing economic conditions. With this in mind our new sales program is essentially different from past programs.

"Typical of the changing economy in the area, it is found that agriculture in the southern part of the territory is suffering a decline. Where there used to be vast acreages of orange groves we now find industrial plants, shopping centers and housing tracts. Also until 1945, homes were built largely on an individual basis. Today large-volume tract builders are providing a major portion of new housing units. The tract builder, therefore, relatively unknown before the war, is now one of our most significant prospects.

San Diego G&E's F. M. Raymond and Harry Calloway, chairman of the Light Diamond Jubilee Sell-A-Bration Days, show Jubilee presentation at bureau meeting

"Since residential load earns a better rate of return and because one of our principal objectives is to increase average annual residential kilowatt-hour usage substantially, heavy emphasis will be placed upon promotional activities with tract builders during the next few years. This is especially important because a great deal of equipment is now built into homes and if the equipment is not electric at its inception the prospective load in these homes will be lost for many years.

"This of course does not constitute our entire sales program. It will embrace all segments of the company's load but will be guided by this maxim: greatest effort will be exerted to obtain that load in all fields which produces the greatest net return and which is the most economically sound in the long run."

Noting that one of the most unfortunate results of the moratorium on selling caused by war and postwar conditions is that the company has fallen behind the national average in residential kwh use, the booklet states "our indicated average at the end of 1954 was 1,930 kwh; the national average was 2,550 kwh. This means that we are 620 kwh per customer behind and approximates $10,000,000 in lost gross revenue during 1954.

"The home building activity in our area is still at a peak. So while we're encouraging our present customers to use more electricity, we also will have the job of selling new customers."

Since the national average is a fast-moving target, it will be about 4,500 kwh in 10 years. To reach that figure about the same time, Edison is planning to increase its rate of gain from about 100 kwh per year to 155 in 1955, 215 in 1956 and 275 in each of the next eight years.

It is planned to encourage particularly sale of electric appliances for homes in the $12,500 to $20,000 price range.

Will Help Builders

For builders who cooperate in the program to install electric kitchens, laundry and heating equipment, the company will help with specifications for adequate wiring, light conditioning, kitchen planning and heat pump installation. Edison representatives will see the building projects through to completion. When requested, it will assist in equipment selection and act as liaison between builders and manufacturers. It will give promotional assistance for tract home builders wherever possible.

The company will coordinate its campaigns as far as practical with the EEI program and promotional efforts of appliance manufacturers, distributors and dealers. It will aid with its electric living centers, kitchen planning service, school counseling and displays at fairs and exhibits.

Residential Quotas

Quota for new residential sales revenue in 1955 is $3,400,000. It is estimated that in the residential field there will be sold during 1955: ranges, 15,000; water heaters, 3,000; heat pumps, 3,000; refrigerators, 60,000; washers, 50,000; ironers, 10,000; dryers, 6,000; dishwashers, 15,000; home freezers, 25,000.

It is hoped to add 3,900 hp in street and highway lighting for $390,000 revenue, 35,000 hp in plant and factory lighting for $790,000 revenue and 96,000 hp in stores and offices for $3,828,000 revenue.

It is expected to add 6,000 kw in commercial cooking load for a total of 12,700 kw and estimated annual revenue of $360,000.

Addition of 15,000 kw is the 1955 goal for industrial heating. In the field of commercial heating, emphasis will be on water heating. With a market in sight of 6,000 kw of load in air conditioning in commercial establishments and 2,000 kw in industrial plants, promotion will give particular emphasis to installations including the use of heat pumps.

A concerted effort will be made to sell electric power to the petroleum industry. The program also will seek completely electrified farms with high annual load factor.

Colorado

Colorado Central Power

We expect business in our service area to be better in 1955 than in 1954. This applies to both kilowatt-hour sales and appliance sales. The outlook for new home building is excellent.

We do not merchandise. However, we cooperate with appliance dealers by subsidizing part of the installation cost of electric ranges and electric clothes dryers. We plan to continue this program, which has helped to increase sales. Major appliance sales in 1954 were good although the drought in our farming area did affect sales. —*Lawrence L. Gann, commercial manager.*

Southern Colorado Power

Looking back on 1954 we find it to be quite a year for both business (retail) as well as progress in new construction. Residential building was up about 20-25% above 1953 in number of housing units built. The total valuation per unit was down a little, which indicates construction costs are going down somewhat since the same or similar construction is going into the homes.

Industrial and commercial also showed good progress in our area although it cannot compare with 1953 as the CF&I Co.'s $30,000,000 seamless tube plant was such a large factor in 1953. Retail sales in all categories showed substantial increases for the year according to various business reports as well as those of the Federal Reserve figures for this area.

Appliance sales will show a healthy gain, I am sure, although the reports for November and December are not complete as yet. Many dealers reported the best Christmas business since the end of World War II. This certainly was the case in our sales. The "Operation Snowflake" program sponsored by U. S. Steel received a fair support here and for those dealers who were able to and who did tie in with it the results were gratifying. We used the theme in all of our advertising and the radio and TV stations cooperated completely with the program. If more manufacturers and distributors had tied in with it, it had the makings of a grand promotion. A great deal of credit should be given USS and *Saturday Evening Post.*

Looking into 1955 we can see nothing to blank out our rosy viewpoint. Scheduled construction for 1955 is already ahead of 1954 and prospects are good for things that are not in the process yet. Industrial, commercial and institutional construction will far exceed 1954. Residential construction will, according to the major builders, exceed 1954 and we believe that their outlooks are well founded. If the above conditions pertaining to construction prove out, then retail business cannot help but be good.

We are building a new plant addition at Canon City that should be on the line somewhere in late summer or early fall. This plant will bolster our capacity in the system as well as give us complete protection against emergencies in the west end of our property. Also to be built this year will be a 115-kv transmission line to the east end of the property from Pueblo. This will reinforce our capacity now handled by two 69-kv lines in that direction. This line also will give us 115-kv lines between all our plants as well as a tie with the Colorado Springs system at that point. We have several good industrial prospects of sizable power requirements that will place in good position with these higher capacity facilities.

We expect to take the lead this year in the promotion of such load building equipment as freezers, dryers, automatic washers, water heaters and, of course, our old stand-by the electric range. Our plans generally will follow the schedule arranged by NEMA. We also will place a heavier emphasis on adequate wiring promotion and are seriously considering the financing of such improvements as several other utilities are now doing. At the present time we are making an extensive study of water heating, loads, capacities, wattage ratings, etc., and will further study the new high-wattage quick-recovery heaters that some utilities have been experimenting with in the past few months.

We had the most successful Christmas Lighting program this year in the history of this area. More homes competed, even commercials and industrials were quite prevalent in the picture this year. The homes seemed to be done with more thought to the real idea of Christmas this year and all-in-all it made a very impressive demonstration.—*E. H. Pemberton, general sales manager.*

Idaho

Idaho Power

The year 1954 was an excellent year for us. Revenues and kilowatt-hour sales in all classifications exceeded substantially the 1953 pictures. Average

With a lively and well-illustrated booklet, the Edison company announced its return to the active selling and sales promotion field

kilowatt-hour sales per customer, year ending 1954, are as follows:

Residential	5,364
Farm	6,877
Domestic	5,780

This is an average increase of 326 kwh per domestic customer over 1953.

We have had a very successful year in the commercial field, which was the result of a very successful commercial campaign carried on through the months of June and July that added 5,000 kw in small commercial business to our lines. Called the "Quota Busters" campaign, this program had as its object the selling of new load that would produce kwh and revenue immediately, including cooking, water heating, flood, window and accent lighting for small stores, auto showrooms.

Our light bulb activity in '54 was a most outstanding one. All divisions exceeded their quotas and approximately $40,000 of light bulbs were sold in a six-week period. Our special floor lamp activity was set up to sell 500 floor and table lamps and wound up with 630, which again was a quota buster. All in all, we have had a very successful year, which we feel was due to our aggressive 1954 sales promotion activities, special campaigns and advertising promotions.

1955 Program

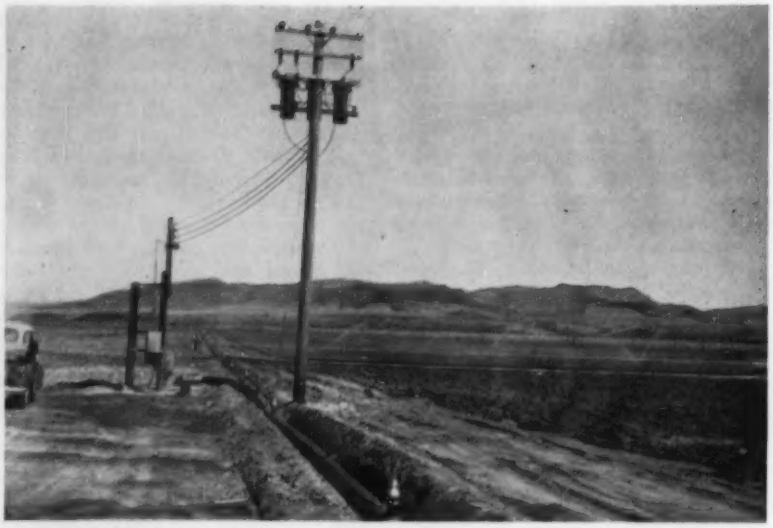
The 1955 sales program was introduced at meetings throughout the company system. All-day sessions were held for employees and evening meetings for dealers, distributors, and manufacturers.

The company will make every possible effort through special promotions, advertising, contacts to secure prospects, training program and home service activities to assist dealers and all other sales allies in securing more dealer dollars in 1955. The job of getting its full share of the consumer's dollar for the electric industry is one requiring teamwork by all branches of the industry—dealers, contractors, distributors, manufacturers and the utility company. The 1955 dealer program sponsored by the company is intended to provide a basis for successful teamwork throughout southern Idaho and eastern Oregon.

A home laundry campaign will be carried on during January, February and March and during October, November and December. The electric dryer is a fairly new appliance in this area with only about 25% saturation but it is one of the most wanted appliances. A drive for new range and water heater sales is set for April, May and June. Although the electric range has an 81% saturation in the area, there is still a good potential market in the 100-200 kwh customer use bracket. The replacement market has a tremendous potential and the majority of 1955 range sales will be obtained through it.

Home freezers, a low-saturation appliance, will be promoted during June, July and August. The annual light bulb activity is scheduled for September and October. It will again be a cooperative company and dealer program sponsored by electrical distributors in the area. The annual floor and table lamp compaign will be launched simultaneously with the light bulb selling campaign.

A sustained adequate wiring program will be conducted during 1955 to divert a greater share of the building dollar into wiring. The company will work closely with electrical contractors and dealers, and will sponsor a financing program for wiring.—*A. S. Gilbert, sales manager.*



Pumping installations like this one built up electric load on Idaho Power Co.'s system

Montana

Montana Power Co.

The steady growth and firm economic position that Montana has experienced in the nine years since World War II are expected to continue in 1955. Wheat and livestock production were down in 1954 but should maintain at least as good a position in 1955 as they did last year. Increases are forecast in other agricultural crops, with increased use of irrigation pumping anticipated in the state.

Value of production in the mineral industry declined last year, due principally to a major work stoppage in the nonferrous metals operations, but production has returned to normal and is expected to increase substantially over last year. The lumber industry continues to show steady increases, reflecting improved position both in regular operations and in the development of several new hardwood and plywood plants.

Record Tourist Business

The tourist industry, which now is Montana's third largest from the standpoint of value, had a record year in 1954 and is expected to continue its uptrend. Substantial building construction and increased use of electricity throughout the state reflect the steady population growth that has been under way since 1945.

The number of residential electric customers served by the Montana Power Co. increased nearly 3% in 1954, while commercial customers increased by 2.3%. Kilowatt-hour sales of electricity also were up in these two categories, increasing 13.2% for residential consumers and about 9% for commercial users. Montana Power during the year installed additional generation and other facilities to stay ahead of the growth that is anticipated in 1955 and, with the 1954 additions, there will be a substantial surplus to handle all increases.

Sales Effort Needed

Electric appliance sales are about the same as last year and the known existence of a good market indicates a definite need for more aggressive sales effort at the distributor and retail levels. The company's 1954-55 rural sales campaign is off to a good start

New mercury vapor street lighting was installed last year in communities of Bend and Prineville on Pacific Power & Light Co. system

and all indications are that it will far exceed the 1953 campaign. Television sales are continuing at a high level and, with the installations of additional community antenna systems, should continue at their present level through 1955.—*D. J. McGonigle, general sales manager.*

Nevada

Sierra Pacific Power

Business during 1955 will be a continuation of the excellent results we experienced in 1954.

Reno and Sparks enjoyed a great building boom during the year and we added 1,314 residential customers to the lines along with an increase of 357 customers in the commercial field.

We estimate the average growth during 1955 will be 1,400 residential customers and 325 commercials.

Our dealers produced the sale of 1,137 ranges, 817 water heaters, 2,454 refrigerators and 189 space heaters at a direct cost to us of $2.62 per unit, through our Reno Plan, and we do not employ the use of any promotion plans at all. Residential use at the end of December 1954 amounted to 4,274 kwh.

Business will be so good in '55 we know we will break all existing sales records.—*A. L. Pierce, manager, new business department.*

Southern Nevada Power Co.

Las Vegas is assured of good business conditions in 1955 because of the six large luxury hotels now under construction and several more that are scheduled to start during the year. Several of the large chemical and mineral refining plants have plans to increase their plant capacities at Henderson, which will have a wholesome effect on this entire area.

Boom Brings Growth

Southern Nevada Power Co. has not had an active sales organization but we have recently set up the nucleus of one under Harry Allen, commercial manager. Las Vegas is in a boom situation because of its emergence as a leading entertainment center of the U. S. As a result we have had a customer growth of 27.2% during 1954 and energy sales have increased 22.5%. Customer usage is very high also because of exceedingly low rates that go down to ½c per kwh and encourage the generous use of electricity for space heating. Our average domestic customer used 9,821 kwh last year, which is far above the national average for residential use.

Our first steam-electric generating station will be in service late in 1955, which will permit us to push our sales activities and the advent of natural gas competition in this area makes this program necessary.

Will Push House Heating

Electric home heating will be given considerable attention during the year. We now have some successful installation of heat pumps, using water as the transfer agent, for electric year-round air conditioning. We are starting experiments with 3-hp and 5-hp heat-pump units using air as the transfer agent.

The company will not merchandise directly but will promote the sale and installation of major appliances by contacts with home tract developers, hotel and commercial builders, retailers, architects, etc.—*Reid Gardner, president.*

Oregon

Lane County Electric Co-op

In a 1954 survey of appliance saturation and prospective sales, a return of 40% from 4,200 members covered was achieved, according to Glenn R. Sawyer, manager. While the figures emphasized the large investment members have already made in electrical appliances, they also indicate a good potential market in the rural areas of Lane County, it is pointed out.

Following are a few of the items:

Presently Have

Appliance	No.	% of Survey	Total for Entire Project
Refrigerator	1,625	98	4,060
Electric range	1,079	65	2,697
Water heater	1,094	66	2,735
Automatic washer	379	23	947
Conventional washer	1,086	65	2,715
Electric dryer	276	17	700
Dishwasher	45	3	112
Home freezer	513	31	1,282
Television	187	11	468

Expect to Buy

Appliance	No.	% of Survey	Total for Entire Project
Refrigerator	32	2	80
Electric range	93	6	235
Water heater	120	7	300
Automatic washer	79	5	198
Conventional washer	14	1	35
Electric dryer	137	8	342
Dishwasher	24	1½	60
Home freezer	186	11	465
Television	259	15	647

Texas

El Paso Electric

We do not contemplate much change in El Paso's industry or economy for the coming year except the normal expansion of existing industries. Home building is expected to be about the same as for 1954 when some 5,500 new residences were constructed.

The appliance business should not change too much. There will be still a shortage of outside salesmen and need for creative dealers in this area. We have been giving these problems much thought.

In 1954 during the 75-day Diamond Range Jubilee, 504 electric ranges were sold as compared with 358 during the same 75 days in 1953. Pushing and pulling together produced this result.

The company's Reddy Kilowatt appliance dealer coordinated campaign for 1955 will promote ranges and water heaters in March, April and May; ranges in September, October and November; freezers and air conditioners in June, July and August; dryers and automatic washers in January and February; dishwashers and disposals in October and November; electrical gifts in December. — *Franklin C. Quinn, dealer counselor.*

Utah

Provo Electric Power

A survey, just completed, indicates we can anticipate some increase in industrial and commercial power sales for 1955. Residential sales leveled off in midsummer of 1954. Since that time, however, residential sales have moved ahead into the normal pattern established in 1951 showing a consistent increase of 7.5%.

Being a municipal utility, our growth will be more or less stabilized. We cannot hope to expand through added industries because our industrial area is limited. We can continue to grow through commercial and residential development. Presently we are averaging approximately 100 new homes per year.

We have planned a vigorous sales promotion in adequate wiring. We will promote the changing concept in commercial and industrial lighting, and also the revamping of old and obsolete wiring systems.

Provo is now the home of the largest university in Utah. The Brigham Young University adopted a building program in 1952 involving several million dollars. This project is about one-half completed. Since 1952 its power consumption has increased 85%. The university will continue to buy additional power until this building project is completed.—*Sharp Gillespie, superintendent.*

Utah Power & Light

With the slogan "More Drive in '55," Utah Power & Light Co. and Western Colorado Power Co. plan to sell harder in the competitive year ahead to get their share of the consumer's dollar. The second half of the 1950s holds even more sales promise than the first half, which have been good years for the electrical industry, W. A. Huckins, manager of the Business Development Department, states in announcing sales plans.

Market prospects are even brighter in the companies' service area than nationally, Huckins thinks, and he cites these indications:

Big population gains—Since the beginning of 1950, Intermountain population has increased 10%—well over the national average.

Income is up—Per capita personal income has shown even greater gains than population in the area—up 16% since the beginning of the decade.

Production jumps—Metal production is up approximately 20% over five years ago and cash farm income is up some 16%.

Construction booms—Building has set records during 1954. Utah's construction is up approximately 30% over 1953. Prospects for immediate years ahead remain exceedingly bright.

New natural resources tapped—Big new sources of supply have been opened—particularly with phosphate and uranium. Even greater exploitation of raw materials is ahead.

Company is prepared—A big expansion program is near completion. In the five-year period, capacity has been increased by more than 100% from 260,138 to 521,738 kw. There will be plenty of electricity for all demands.

Bigger gains coming—The 1950-60 period will show: population up 27%; labor force up 26%; capital investments up 26%, Huckins predicts.

In its cooperative program with all segments of the industry, the companies plan to promote aggressively sale and use of electric appliances and equipment, as well as adequate wiring in homes, on farms and in factories. They will carry on the biggest advertising program in company history; will sponsor fairs and shows; take an active part in association and other activities aimed to improve business; will aid in area development: will help train industry salesmen to meet growing competition.

It is estimated that 1955 appliance sales in this area will include:

Electric ranges	8,500
Refrigerators	9,000
Freezers	4,000
Water heaters	4,000
TV sets	15,000
Washers—automatic	8,000
Dryers	4,000

Washington

Clark County PUD

Use of electricity in Clark County, Wash., showed a healthy increase in 1954 and the Clark County Public Utility District is basing its 1955 plans with confidence in a forecast of continued growth.

Residential use of electricity continued far ahead of national average, with householders using an average of 6,485 kwh of electricity in 1954 as compared with 6,051 kwh in 1953. Average price per kilowatt-hour drop-

DeLamar Holt, Utah P&L residential and farm director, receives trophy for company exhibit at Utah State Fair from J. A. Theobold, secretary-manager of the fair association

ped from 1.16c per kwh to an estimated 1.13c last year.

The PUD served an average of 29,474 customers in 1954, an increase of 295 over the previous year. This does not reflect a true picture of area growth, however, since contraction of a large public housing project "skewed" statistics. Crews ran services to nearly 900 new homes during the year and installed 235 temporary builders' services and 103 new commercial services. The local building boom in homes is expected to continue through 1955.

Campaign Successful

During the year the district conducted a campaign for installation of new ranges and water heaters. With excellent dealer cooperation, the three-month drive resulted in 250 ranges and 350 water heaters being added to the utility's lines.

A farm power use advisor was busy through the year and despite a very wet growing period added 530 hp in irrigation pumping load. This brings the utility's total irrigation load to 3,380 hp.

Six cooking schools were held in five different communities by our home economist in the interest of promoting use of electric kitchen appliances. Attendance totaled 1,300. Talks before women's groups, clubs, granges and home visits brought her total contacts well above the 7,500 mark for the year 1954.

Promotion plans for 1955 include another range and water heater installation promotion. Participation in locally sponsored home shows, the County Fair, Christmas lighting contests and community promotions will also be continued. Two salesmen, our farm power use advisor and home economist will work throughout our sales area. Radio and newspaper advertising will be continued by the district and will be geared to seasonal promotions.—*V. M. Cleaveland, manager.*

Cowlitz County PUD

We were well satisfied with our kilowatt-hour sales in 1954 and 1955 promises to be as good as 1954 as far as kilowatt-hour sales to residential customers are concerned. A prolonged lumber strike did reduce our industrial business to some extent last year.

We have a paper mill and a chemical plant locating here this year but this load is not expected to be on our lines until early in 1956.

Home building is expected to continue at its 1954 pace. We serve approximately 20,000 customers of which approximately 18,000 are residential. We had a total of 2,080 requests for new or additional loads for the year; 1,111 of these were for residential electric heat. More than 65% of the new homes being constructed in Cowlitz County are being equipped with electric heating.

Out of 539 new permanent services (residential) installed during 1954 only 61 were two wire (this includes separate service to domestic pumps, barns, etc.).

TV and clothes dryers led the field in appliance sales.

At present we have approximately 75% range and water heater saturation and our major sales effort in 1955 will be beamed at the remaining 25% with an effort to get as many of these changed to electric range and water heaters as possible. We had 538 changes from two- to three-wire service during 1954.

The district employs a home service representative, Mrs. Jean Martin, who has a very active home lighting program among teen-age (girl scouts and 4-H clubs) and adult groups. Her only limit in this program has been available time. She uses the Poldon Lamp Kit in this work. The student assembles the lamp in class and when it is finished is allowed to purchase it at cost. Pertinent facts about good lighting are taught as the class assemble their lamps.—*Lacey M. Peoples, commercial manager.*

Puget Sound Power & Light

Puget Power's 1954 sales program—Operation Jet—proved quite successful. The average use of all residential customers for the 12 months ended Nov. 30, 1954, was 5,794 kwh, an increase of 600 kwh or 11.6% over the 5,194 of the year previous. This 600 kwh compares with an increase of 288 kwh for 1953 and an estimate of 370 kwh for 1954. During the year 10,000 all-electric customers were added to make a total of 100,000 cooking and heating water entirely by electricity. These customers had an average annual use of 8,457 kwh and a resultant average rate of about 1c per kilowatt-hour. The increase in industrial revenue was affected by strikes but the increase in commercial revenue in 1954 was twice the increase in 1953.

Puget's 1955 program—Operation Live Wire—looks equally good. To bolster the program, the following changes were made in December: Clarence Scheyer, formerly industrial sales director, was appointed general sales manager and a sales supervisor and home service representative were added in each of the four divisions to work with the electrical dealers, contractors and architects in building load.

For the first time in several years, Puget will have programs on all of the 10 radio stations and the two TV stations in its service area. Newspaper advertising is also being materially increased.

The 1955 revenue budget calls for an increase of 10.64% in residential use, 9.47% in commercial, 7.61% in industrial and 9.61% in total revenue. With the excellent start made in 1954, we believe that 1955 will be an even more successful year saleswise.—*Pat Johnson, vice-president.*

Seattle City Light

The economic stability and growth of the Seattle area in 1954 is reflected in the confidence of large capital invested in plant expansions and in the new construction of buildings for business and industrial purposes; also in the large growth of residence communities adjacent to the city. Nearly 100% of all newly constructed residences installed electric cooking and automatic electric water heating.

It is also gratifying to report that all new interplant feeding installations were all-electric.

We believe that this business trend of 1954 in the area will continue through 1955.

In March of '54 we renewed a

A 60-day electric range campaign held by dealers, the Intermountain Electrical Assn., Utah Power & Light Co. and Western Colorado Power Co. netted 2,040 old ranges

successful residence load building program of the previous year. It is a promotion through the electric and plumber dealer directed at the replacement of flame equipment used for cooking and water heating. Each customer is paid $30 through the dealer for the installation of an electric range replacing flame-type range and $25 for installation of 50-gal-size tank, or larger, replacing flame-type water heater. In nine months this promotion provided the dealers with sales of 1,878 electric ranges and 2,449 electric tank water heaters that replaced flame-type equipment. The promotion has been extended for 1955.

Our revenue producing program for 1955 includes a continuance of the 1954 commercial electric cooking, commercial electric water heating and air conditioning program. Promotion consists of helpful guidance to the dealer and customer relative to wiring and plumbing installation and partial subsidy of these items. Program includes survey of electric commercial cooking and water heating equipment now installed with the objective to improve performance.

Promotion in 1954 provided installation of 862 hp of air conditioning, 4,356 kw of commercial cooking and 1,668 kw of commercial electric water heating.—*J. D. Gawne, electric sales supervisor.*

Snohomish County PUD

The business outlook in the area served by Public Utility District No. 1 of Snohomish County continues its firm tone with indications pointing to higher levels during the year 1955. The Scott Paper Co. is planning for the installation of two additional high-speed paper machines during 1955.

To meet the increased demand in electrical energy from industry and home building we have budgeted over $2,000,000, which money will be expended during 1955 for plant improvements.—*A. S. J. Steele, manager.*

Tacoma City Light

Department stores experienced their best Christmas business since 1945 with traffic appliances showing considerable movement. While white goods sales were not phenomenal, inventories are the lowest they have been for several years. Bank reports show that individual savings are up 8% over last year with average individual incomes slightly higher, all pointing to considerable available buying power.

Although this picture looks optimistic, competition for the consumer's dollar is going to be keener this year than it has been for a number of years. The "buyers' market" is definitely with us, which means that aggressive promotion will spell the difference between success or failure in sales during 1955.

A dishwasher winner in one of last year's promotions was Mrs. John Eyre of Spokane, who receives her prize from Frank Tool, Washington Water Power dealer coordinator and manager of the Inland Empire Electrical League, and A. E. Brown of the Densow-Brown store, from whom Mrs. Eyre received her entry blank for the contest

We expect to stimulate our residential business with an increased wiring promotion as well as some kind of an adequate wiring program. We will also put considerable emphasis on our commercial lighting and cooking loads.—*H. A. Cole, superintendent, light division.*

Wyoming

Cheyenne Light, Fuel & Power

The Cheyenne Light, Fuel & Power Co. serves a very small portion of Wyoming and is located in the southeastern corner of the state. Our local economy is based on two railroads, the cattle and sheep business and the state and federal offices that are located in the capital city of Cheyenne.

We can see little change in business conditions in this area and as a matter of fact we are somewhat optimistic about 1955. This optimism will be especially borne out if we are able to get sufficient rainfall to take care of sheep and cattle feed. The promotional activities that we plan for this year are as follows: January and February—automatic clothes dryers; March, April and May—automatic water heaters; June and July—modern cooking equipment; August and September—home freezers; October, November and December—home lighting (portable lamps).

Since we are a long way from industrial centers, the few manufacturing plants that we have in our territory are small ones. We are constantly working with the assistance of our Chamber of Commerce to obtain additional small manufacturing plants as we have an ample supply of low cost electricity and low cost natural gas available here. One of our claims to nation-wide publicity is our famous Frontier Days, "The Granddaddy of Them All," which draws huge crowds from all over the country and is always scheduled during the last week of July.—*W. B. Petch, commercial manager.*

Hawaii

Hawaiian Electric

In keeping with Hawaiian Electric Co.'s faith in the growth and prosperity of Honolulu, the new power plant was completed ahead of schedule and will add 50,000 kw to HECO's system, bringing the company's total power capability to 270,000 kw when the new plant is in operation.

A campaign calendar for 1954 was set up by the Electrical Living Committee, PCEA (Hawaii), and cooperative campaigns were carried on through the year with particular emphasis being placed on electric dryers, range and water heaters, home freezers, electric housewares and television, and the all-electric home. All programs could be considered successful from the standpoint of sales but the freezer schools, under sponsorship of the Honolulu *Star Bulletin*, and the all-electric Cinderella Home, sponsored by the Honolulu *Advertiser* and tying in with Light's Diamond Jubilee, were probably the most spectacularly successful. Approximately 6,000 Honolulu homemakers were exposed to the home freezer and, during a month's opening there were over 50,000 visitors to the all-electric Cinderella Home.

We are too modest to claim full credit but do feel that the advertising and promotional efforts have had much to do with the increase in kwh consumption in 1953 of 3,221 to 3,500 as of Dec. 31, 1954.

There is evidence of many new subdivisions being started and a great many of the builders are including such things as built-in ranges and electric water heaters. In addition to this, there is an awareness on the part of electrical contractors of the importance of adequate wiring. With the advent of the 25th Division to Honolulu and more military groups promised, there should be an upsurge in residential building.

Through the Chamber of Commerce and other interested groups, island in-

dustries are being studied to create greater stability and self-sufficiency in the island economy and the tourist industry has grown to such proportions that many hotels are in the process of construction to accommodate the thousands of tourists who are coming to Honolulu annually. More adequate facilities are also in the planning stage to take care of larger convention groups.

Future Looks Good

Unless world conditions are such that the cold war develops into a shooting war, I feel that conditions in the islands should continue to be prosperous and the electrical industry should prosper along with the rest. Another thing that plagues us here in planning promotions is the current shipping slowdown. This condition makes it difficult to forecast just what stocks will be available during a given period.

Because of the delay in our rate hearing, upon which we have had no decision as yet, our 1955 promotional plans were necessarily delayed. The commission frowned on our free wiring allowances and they cannot be included in our plans for this year. However, the company is participating in 1955 campaigns on a cooperative advertising allowance basis. The company also plans to develop an area development program in cooperation with other island groups.—*C. E. Nolan, vice-president and promotional manager.*

Canada

B. C. Electric, Vancouver

British Columbia will forge ahead and develop mightily in 1955 as she has every year since the war. While some of the new industrial activity will be in parts of the province not within our company's service area, we anticipate a steady growth of customers and electrical consumption.

Active load building promotions are planned for residential, commercial and industrial fields with more emphasis than in the past on lighting, including residential. The new home building program, which was extremely active in 1954, is expected to be even greater this year.

The expanding economy of the province continues to add secondary industries and further progress in this connection is anticipated because of the possibility of natural gas being available in this territory in 1957.

Retail appliance dealers anticipate a very busy year with customer demand remaining at a high level. We have just completed our first full year of television reception from a local station with more than 55,000 sets now in use and an additional anticipated 50,000 sets being purchased in 1955.

All-in-all there is a general indication that business conditions throughout our service area during the year will be slightly better than those of 1954. We will have to promote a little harder and make more effective customer calls so that the electrical industry will remain an important factor in our expanding economy.—*J. H. Taylor, residential sales manager.*

Utilities cooperate in community celebrations such as Cheyenne's Frontier Days

B. C. Electric, Victoria

Economic conditions in British Columbia, sparked by the healthy tone of the forest industry, are holding up remarkably well and a good year is anticipated for 1955. Residential new building increased considerably in 1954 and it is anticipated that new building in 1955 will equal that of 1954. Most of the homes will be of high standard, with adequate wiring being installed, and many of them qualifying for Red Seal certificates. Farm economy for Vancouver Island during 1954 remained in a good to high plane and considerably above the level of comparable areas in Canada and the U. S., and prospects are good for 1955.

Dollar volume of appliance sales was at an all-time high in 1954 with television leading the way in dealer sales. It might be of interest to note here that Victoria is rated as the third best area on the continent for reception of TV programs, being served by one Canadian and six American stations; the only two cities having a greater variety of programs being New York and Los Angeles.

It is anticipated that 1955 will be another good year and plans will have emphasis on promoting the sale of all white goods. Dryers, dishwashers and disposers will receive special attention through use of continuous utility advertising by means of newspapers, billboards, bus cards, radio spots and free consumer pamphlets and showcards to dealers. In addition, trade-in plans, sales training, consumer cooking schools, group presentations in dealer stores, sales contests and home service calls will be featured throughout the year. We will continue to promote better lighting through the use of dealer contests and bonus lamp bulb offers.

Following the excellent results achieved during 1954 with national promotions such as "Light's Diamond Jubilee" and the "White Christmas" campaign by U. S. Steel, we expect to tie in with similar promotions in 1955. We will also conduct a farm lighting campaign with emphasis on efficiency, safety and protection.—*A. W. J. Smith, sales manager.*

A dealer in B. C. Electric territory ties in with the White Christmas promotion

ELECTRICAL WEST

Horizons Are Unlimited

IF anyone harbors doubts as to the dynamic future of the Western electrical industry, then the pages of this issue should dispel them. The record of achievements of the past year and the goals set forth for 1955 spell out accomplishments and opportunities that should instill pride on the one hand and insure optimism on the other. A solid 7% growth in electrical use; a $700 million utility building program; a $4½ billion construction market more than half of which is new homes; 5¾ million electrified homes and farms that buy more appliances and use more electrical energy than those in any other region—all these make up the foundation on which utility, manufacturer, distributor, contractor and dealer can build. Couple all this with a continuing influx of new people and the progressive spirit of the West and one sees horizons unlimited for the electrical industry.

Good Weather Ahead

ONE of the prime influences affecting the stable pattern of economic activity that characterizes the business outlook is the favorable climate in which business and industry have been working. Without it the economic adjustment that business weathered in 1954 might have developed into a serious recession. Without it there would be little reason for optimism for the near future.

The basis for this favorable climate was admirably set forth by President Eisenhower in his state of the nation message to Congress:

"The aspirations of most of our people can best be fulfilled through their own enterprise and initiative, without government interference. This administration, therefore, follows two simple rules: First the federal government should perform an essential task only when it cannot otherwise be adequately performed; and second, in performing that task, our government must not impair the self-respect, freedom and incentive of the individual. So long as these two rules are observed, the government can fully meet its obligations without creating a dependent population or a domineering bureaucracy."

In a climate fostered by principles such as these the electrical industry can grow and prosper.

1955—A Year to Sell, Sell, Sell

"THIS year—1955—marks our re-entry into the field of active selling and sales promotion. And the sales program we contemplate is not just a program for one year. It is a selective, hard-hitting, continuous effort." Give or take a word here and there and that statement by Southern California Edison President Harold Quinton to his employees epitomizes the attitude of Western utility management. Our industry is embarking into an era of hard, rough, tough competitive selling.

There is an almost universal similarity in the business-building programs which the various utilities in this region are undertaking. Each is sufficiently flexible to invite and encourage all of the cooperation available from friends and allies in the field of selling. They are based on the fundamental that selling in the electrical industry is a highly cooperative activity based upon common objectives. Manufacturers, wholesalers, contractors, dealers, architects and builders all have a stake in the promotional program and performance of the utility. Each succeeds in direct ratio to his responsibility and effort.

For its re-entry into the field of sales and sales promotion, Edison merits and will receive an industry salute. Here in the West we now have a solid sales front from border to border that augurs a rough time ahead for competition.

Whose Monopoly?

SO a Senate Judiciary subcommittee thinks that "monopoly runs wild" in the electric power industry! To combat this and other alleged monopolistic trends in business, it proposes a Congressional investigation. When

EDITORIAL VIEWS

one reads news of this sort from Washington, he wonders if the Congressmen who propose such things are not far more naive than the public they expect to influence. Basis for the charge is the mistaken belief that the Dixon-Yates contract is a "dramatic manifestation of the new monopoly movement." As a matter of fact the TVA, whose generation would be supplemented, holds the monopoly.

Perhaps the proposed inquiry would be a good thing, particularly for the edification of the Congressmen who suggest it. They would find that the federal government itself has been building the only threatening monopoly in the electric power business. It would show that since World War II the federal power giant has grown from 4.9 million kilowatts to 12.8 million; that it has an additional 6.9 million kilowatts under construction; and that another 9.3 million have been authorized. Furthermore, if the aims of the federal power monopolists were all to be realized, the total would be 69 million kilowatts.

And the avowed aim of the socialists is a complete federal monopoly of all power. From that they can move into monopoly of other businesses. If the investigation will penetrate into that side of the matter, it will reveal some monopoly worth curtailing.

Maybe the investigation should be encouraged. Facts like these are not generally known or their significance appreciated.

Put the Partnerships to Work

IF the partnership philosophy of resource development as expressed in the administration's power policy is to mean anything, the present Congress must implement it with legislation. Utilities in the Pacific Northwest —private and public together—have filed applications with the Federal Power Commission for 6,000,000 kw of projects estimated to cost $2 billion. The great majority of these involve cooperation with the federal government on the nonpower phases of the undertakings. Two are in the stage where immediate legislation would not only implement them, but would set the pattern for the remainder.

Future power supply for the region depends on early action. The present federal projects—McNary, Chief Joseph and The Dalles—plus the foreseeable nonpartnership developments will meet the power needs of the Northwest up to 1960. This presupposes that Congress will continue to appropriate funds to complete the aforementioned major federal power developments. As one utility executive recently pointed out, the partnership jobs are huge ones that take time to plan and build. "We have been assured of our part of the financing," he said, "all we need is a green light." That is up to Congress.

IN connection with the problems of water policy there are fundamental conflicts of viewpoint which must be resolved. We have the flood-control minded who would release as rapidly as possible after a flood most of the water stored back of the dam to save the space for future flood protection. We have the irrigation-minded who believe that no water should be released even for hydroelectric power, except in the irrigation season or unless the supply is surplus for the foreseeable future. We have the power-minded who believe that government hydroelectric plants should operate at any cost and in any event regardless of the effect upon other water users. We have the fish and wildlife people, the national park people and other groups which are opposed to any tampering with areas where recreational facilities, fishing, boating or scenic beauty will be disturbed. The Interior Department, in the very nature of things, lives in the center of these controversies. As perplexing as the problems may seem, I feel sure that when a national water policy is established we can look forward to a new era of cooperation in which the federal government's necessary activities for water resource conservation are intelligently coordinated.—Douglas McKay, Secretary of the Interior.

A MESSAGE TO AMERICAN INDUSTRY • THIRD OF A SPECIAL SERIES

FINANCIAL AID TO HIGHER EDUCATION

Business Aid for Our Colleges—Voluntary or Involuntary?

Previous editorials in this series have shown that:

- As a group the nation's independent, privately endowed colleges and universities are in grave financial trouble, and
- There are many different means by which business firms can extend a helping hand to these institutions.

This editorial, one of a series devoted to the financial problems of higher education, submits this proposition: **If business firms do not voluntarily go to the financial aid of higher education, there is every prospect that they will soon be providing more financial support for higher education involuntarily, through taxation.**

If this prospect materializes, one of the basic elements of a well-balanced system of higher education—a strong array of independent colleges and universities—may well be dangerously weakened if not destroyed. And in the process a potentially crucial bulwark for freedom of enterprise in the United States—that same strong array of independent colleges and universities—will be undermined.

Acceptance of these propositions implies absolutely no disparagement of tax-supported colleges and universities. These have an indispensable role in the total system of higher education in the United States. Leaders of these institutions would be among the first to agree that their position is strengthened by a strong system of independent institutions, supported privately rather than by political agencies.

What is the evidence that in one way or another, voluntarily or involuntarily, business will be giving more financial support to higher education? One impressive part of this evidence is provided by the recent rapid increase in the proportion of college and university students attending tax-supported institutions.

Rapid Shift in Enrollment

In the fall of 1952 tax-supported colleges and universities enrolled about 7.5 per cent more students than the independent institutions. In 1953 this percentage was doubled. And in 1954 the tax-supported institutions enrolled 26 per cent more students.

In the case of students entering college for the first time the relative growth of the tax-supported institutions recently has been even more striking. In 1952, the number of beginning students in the tax-supported schools, as reported by the U. S. Office of Education, exceeded those in the independent colleges and universities by 35 per cent. In 1954, just two years later, this figure jumped to 49 per cent.

Why has the proportion of students attending tax-supported colleges and universities been in-

creasing so rapidly? There are many reasons. But a dominant reason is that, in order to keep going at all, the independent institutions have been forced to make large increases in the prices they charge for instruction. The purchasing power of their endowment funds has been cut in half by price inflation. The capacity of the wealthy to supplement their endowments by gifts, as they have done in the past, has been greatly reduced by high taxes. As a result these schools have been forced to rely increasingly on higher prices for instruction (tuition as it is called in academic circles) to make both ends meet.

Since 1940, the independent colleges and universities have raised their tuition fees by an average of about 60 per cent. This is considerably less than the increase of about 100 per cent in prices generally since 1940. And it is nowhere near enough to prevent the faculty members of the independent colleges from faring miserably in terms of salaries, a matter of major national importance to which we shall return in this series. But the increase in tuition fees of the independent colleges has been much greater than the increase in the fees charged by the tax-supported schools. And that price differential increasingly tends to shunt students into the schools which are supported chiefly by taxes. Independent colleges now charge, on the average, about $580 per year for a full course of instruction while the tax-supported institutions charge, on the average, about $240.

Bigger Tax Bill in Prospect

A large increase in the total enrollment in our colleges and universities during the next decade is in prospect, particularly when the great increase in births during World War II is reflected in the number of young men and women of college age. With a total of 2.5 million students at present enrolled in our institutions of higher learning, it is estimated that the total will be over 3 million by 1960.

If this trend continues most of the anticipated increase in college and university enrollment will be concentrated in tax-supported institutions. Indeed, if the shift toward tax-supported institutions that has occurred in the last three years were to continue over the next six years at the same rate, about two million of the three million students anticipated in 1960 would be in tax-supported colleges and universities and one million in independent schools. In 1950 there was a 50-50 division in enrollment. This shift would mean, of course, a corresponding increase in the tax bill for tax-supported education. And of this bill, we can be sure that an ample share would be assessed against business firms.

No Easy Solution

The best way, of course, to put a brake on a soaring tax bill for higher education is to help the independent institutions get in shape financially to carry a larger share of the student load. For most companies the development of a mutually satisfactory program of financial aid for higher education is a complicated process. In fact, it is so complicated that some companies with an initial disposition to provide financial help are inclined to despair of working out a mutually constructive plan.

If, however, the leaders of business will contemplate seriously the only available alternative to their extending voluntary help to our independent colleges and universities, their determination to work out a plan will be strengthened. For that alternative involves a grave weakening of our system of higher education, together with an involuntary increase in the financial support of higher education by business. The increase would come through higher taxes. Contemplation of such an alternative should, if necessary, toughen the will of business firms generally to do everything possible to extend financial help to our independent colleges and universities.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

NWEL&PA Plans Spring Meetings

Progress in programming the section meetings of the Northwest Electric Light & Power Assn. scheduled for this spring is reported by the section chairmen and vice-chairmen. The engineers and personnel and safety people will join at the Davenport Hotel, Spokane, April 13, 14 and 15; the Business Development Section goes to Salt Lake City, May 9, 10 and 11; and the accountants to Vancouver, B. C., June 22, 23 and 24. The purchasing committee, L. C. McIver, Puget Sound Power & Light Co., chairman, will meet with the accountants this year in a program relating to inventories and stores keeping.

M. D. Duffy, Pacific Power & Light Co., chairman of the Engineering and Operation Section, and his committee chairmen have made room for a joint session with the Personnel and Safety Section on the opening morning of the meeting, April 13. This program will be put on by Peter Piper, Washington Water Power Co., chairman, and Russell B. James, Portland General Electric Co., vice-chairman of the Personnel Section, and Fons Hughes, Pacific Power & Light Co., chairman of the accident prevention and safety committee. This session will portray by skits and illustrated presentations the hiring and indoctrination of a young engineer, the handling of grievances and the designing of safety in operations.

After the opening session, the sections break into their own meetings, and Maurice Hatch, Washington Water Power Co., vice-chairman of the Engineering Section, is apportioning time to the following committees: power production, R. P. Mortell, Puget Sound Power & Light Co., chairman; transmission and distribution, Cecil Brown, Pacific Power & Light Co., chairman; utilization, J. G. Hannum, Idaho Power Co., chairman; meters, codes and services, F. O. Wald, Utah Power & Light Co., chairman; electronics, Fred Green, B. C. Electric Co., chairman; house heating, D. L. Brown, Portland General Electric Co., chairman; electrical equipment, B. F. Hargreaves, Puget Sound Power & Light Co., chairman. Each committee program will be broken up into two sessions, one for the presentation of general subjects and the other for more intensive discussion.

The usual banquet with entertainment will be held April 14 and a luncheon session will close the meeting the following day. Glen George, Washington Water Power Co., is chairman of arrangements.

The Personnel and Safety Section will hold a joint session the afternoon of April 13, and afterward will break up into its own parallel sessions, with the safety men taking part in some of the engineering committee programs.

The Business Development Section at Salt Lake, May 9-11, will devote a first half-day and a third morning session to general sessions, and the middle day and a half of the morning to bureau sessions. Luncheons are scheduled for the first and the last day, with the banquet on the second day. Carrol Brissenden, Portland General Electric Co., chairman, met with his bureau chairmen early in January and completed arrangements for the bureau sessions. W. A. Huckins, Utah Power & Light Co., is general chairman of arrangements, and R. S. Belnap, G-E Supply Co., chairman of entertainment.

Electric Home Bureau with J. F. Skelton, B. C. Electric Co., chairman, will explore what the utility can do to promote more sales through the dealer, will put on a lighting stage show, will hear a presentation of "Parade of Homes" by the Home Builders Assn., will hear an adequate wiring story from the builder's standpoint and will see a live telecast of a home service demonstration, and take up other home service activities. Sally Robbins, Idaho Power Co., vice-chairman of the bureau, will handle the home service program and Evelyn Hansen, home service director for Utah Power & Light Co., will put on the telecast.

In the Commercial and Industrial Bureau, O. J. Horrom, Montana Power Co., chairman, principal subjects for presentation and discussion will be the heat pump, induction heating, commercial lighting, street lighting, 277/480-v Y distribution system, direct-mail advertising and electric cooking.

Karl Dimmitt, Puget Sound Power & Light Co., chairman of the Rural and Farm Bureau, is designing a program to look into load building in the barn, irrigation pumping, cooperate with 4H and other agricultural youth movements, and to examine how the rural representative can sell the farm home. The bureau will also meet for a time with the Electric Home Bureau.

Thomas Chambers, B. C. Electric Co., chairman of the Accounting and Business Practice Section, is arranging to break his program into two parts, after an opening joint session. Customers' accounting will be handled by Vic Jones, manager of customers' accounts for the B. C. company, while general accounting will be under the guidance of Jack Purves, cost accountant for the company.

On one-half day, the customers' accounting group will visit the B. C. company offices to examine procedures that will be used as a basis of discussion the following day. The meeting will close with a joint session on the last morning ending with a luncheon. The usual banquet will be held.

Quick Catch Up

EMEA

Electrical Maintenance Engineers Assn. of Southern California voted on executive committee members for the ensuing three-year term at the Jan. 19 meeting in Los Angeles. Three of a slate of five candidates were to be selected. They were Charles H. Hays, owner, Electrical Estimators; Harry D. Huff, chief electrician and superintendent, American Pipe & Construction Co.; Robert M. McCandless, engineer, H. R. Bente & Associates; Robert Marcum, superintendent of record studies group, electrical and mechanical maintenance, Hughes Aircraft Co.; and Henry R. Schumacher, electrical engineer, Richfield Oil Corp. The executive committee will later elect its officers. "Lubrication of Electric Motor Bearings" was the subject of E. E. Purso, engineer for the Texas Co., at the same meeting. John C. Pyle was also nominated for honorary membership. He recently retired. Charles Doane of Larsen-Hogue Electric Co. is chairman of the electrical maintenance conference to be staged by this organization April 5-7 at the University of Southern California. This will take the place of the usual annual electrical show. H. F. McCullough, general manager, service shops department, General Electric Co., New York City, will address the kick-off banquet April 5.

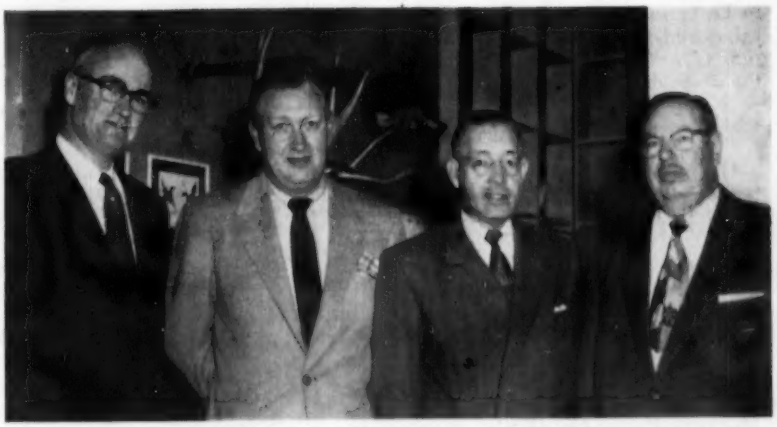
WSEC

Washington State Electrical Council Inc. met in Wenatchee, Wash., Jan. 15 to discuss finances and a plan to bring the bill, for permit fees, now in the Washington Legislature, out of the rules committee. Founded in 1952 for the express purpose of having a permanent organization to promote legislation and the welfare of the industry, it was incorporated Dec. 24, 1954. Incorporators were Sidney M. Coates, Coates Electric Mfg., Seattle; C. D. Casey, Casey Electric Co., electrical contractor, Seattle; T. Ralph Neilson,

Electrical Contractors of Washington Inc.; Dave M. Davis, IBEW Local 46, Seattle; John Majerus, manager, Puget Sound Chapter, NECA, Seattle. Some 40 attended the meeting, representing the state geographically and the industry as a whole.

Temporary officers named were C. D. Casey, president, Lacey M. People, PUD at Longview, vice-president, D. B. Adams, electrical contractor, Spokane, and Ben McLean, electrical contractor, Yakima. The legislative committee consists of Tom Widrig, D. B. Leonard, Joe Krivanek Jr. and Paul Briggs. Ways and means committee consists of Sidney M. Coates, George Picatti, Frank L'Amie and Roy Crosby. Public relations committee consists of T. Ralph Neilson, Arthur Nilsson, Louis W. Scharf and Robert Brecken. On the board of trustees are C. D. Casey, Ben McLean, Lacey M. People, D. B. Adams, Dave M. Davis and Sidney M. Coates.

Constitution and bylaws were read and accepted and the election of a board of trustees will be held in June of each odd-number year. The trustees then elect the officers. Permanent officers will be elected this June. The new organization absorbed all the liabilities of the former mutual organization.



Electrical Contractor P. A. Maughn is the new IEA president (left) succeeding Mark C. Brown. Clarence Gilner succeeds Lewis A. Dahl as Salt Lake retail chapter president

IES

Oregon Section, Illuminating Engineering Society, featured "Home Decoration With Light" at its ladies' night, Jan. 25. Miss Grace Schoeni, Portland General Electric Co., presented the educational program on home lighting.

Northern California Section, IES, toured the new Macy's-Hillside store for its Jan. 13 meeting. After dinner in the garden restaurant of the store, the viewpoint of the owner was given by O. W. Willard, chief, maintenance and construction division of Macy's-California; that of the architect by Kurt Helmstaedter of John S. Bolles, AIA; of the engineer by Ed Shinn of Dudley Deane & Associates. Feb. 3 meeting was scheduled to hear Richard Slauer of Sylvania Electric Products, Salem, Mass.

San Diego Chapter heard about prismatic lenses and plastics at its Jan. 6 meeting. Joe Platt, Holophane Co. Inc., Los Angeles, discussed the characteristics and uses of prismatic lenses. J. W. Richardson, engineer for Rohm & Haas Co., and J. W. Williams, engineer for Electrical Products Corp., discussed plastics in lighting.

Regional conferences are shaping up. The Intermountain Region conference at Westward Ho Hotel, Phoenix, April 11-13, has Jerry D. Whitnell as its chairman. South Pacific Coast Region meeting April 14-15 at Los Angeles Statler Hotel has F. J. Rohring as chairman. And the Pacific Northwest conference April 25-26 at Harrison Lake, B. C., Harrison Hot Springs Hotel, is in charge of Robert Scott. President Duncan M. Jones, eastern Canada representative of Curtis Lighting Ltd., plans to attend the three conferences. Regional winners of the "My Most Interesting Lighting Job" contest will be decided from among the chapter winners.

AMA

Appliance Merchandisers Assn. in Phoenix held its installation of new officers and heard Harry P. Price Jr., president of NARDA, at its Jan. 24 meeting. Henry Sargent, president, Arizona Public Service Co., also addressed the group on regional opportunities for sales.

IEA

Plans for the Intermountain Electrical Assn.'s annual conference, originally tentatively scheduled for February, were deferred, according to James Schricker, managing director. The meeting will be held March 11, at Ben Lomond Hotel, Ogden, Utah, starting at 2 p.m. and running through the evening. The afternoon session will be handled on a workshop basis. An outstanding speaker will address the dinner.

New officers for the year 1955 were installed at a meeting Jan. 15 at the new KTVT studios, preceding a color-TV show and an address by Bennett Larsen of that station.

P. A. Maughn, electrical contractor, was made president to succeed Mark C. Brown. Vice-president is Ernest Schettler. Stan Lakin is secretary-treasurer and James L. Schricker retained as managing director.

Each of the chapters elected officers during December. Clarence Gilner is president of the Salt Lake Retail Chapter and Pete Vrontikis vice-president with Robert O. Trottier, IEA field man, as secretary.

Utah County Chapter elected George E. Larsen of Provo Department of Public Utilities as chairman, Arnold Angel vice-chairman and H. Gilbert Barton secretary-treasurer.

Ogden Chapter named E. Leland Nichols, Lee's Appliances, Ogden, president, Darrell J. Iverson vice-president and Sieman Bowman, secretary-treasurer.

Savier County Chapter installed Evan Michelson of Richfield as its president, Allen Foisy vice-president and Jay F. Gardner, secretary-treasurer.

Southeastern Utah Chapter named Morris Wall of Price as president, Sheldon L. Anderson vice-president and H. Gilbert Barton secretary-treasurer.

The Cache Valley Chapter named Ernest Britenbeker of Preston as president and Homer Lloyd vice-president, W. E. Dunbar secretary-treasurer.

All chapter presidents serve on the board of directors in addition to a group of directors representing the various branches of the industry.

Inspectors

Electrical Inspectors' Assn. of B. C. was to hold its sixth annual conference Feb. 18 at Hotel Georgia, Vancouver, B. C. On the program on a workshop panel were L. Robson, inspector of electrical energy, B. C. Province, and L. Ryan, city electrician, of Vancouver. Luncheon was scheduled with the Vancouver Electric Club, the speaker Hon. P. A. Gaglardi, minister of public works. There were also papers

to be presented on aluminum sheath cable and Pyrotenax cable. Installation of new officers was to conclude the conference.

CMUA

California Municipal Utilities Assn. holds its 24th annual conference at Hotel Senator, Sacramento, Feb. 22-25.

NWURA

Northwest Utility Radio Assn. elected Harold Backen Jr. of Douglas Electric Cooperative, Roseberg, Ore., as its chairman; W. H. Blankmeyer, Montana Power Co., Butte, as vice-chairman; Alan Hunnicutt, Benton-Lincoln Cooperative, Corvallis, secretary; and A. A. Noon, Puget Sound Power & Light Co., Seattle, as frequency coordination committee chairman, at its recent annual election of officers. That meeting was held at Spokane with Washington Water Power Co. as host. Technical and operating problems of radio systems were discussed and current FCC dockets on rules and regulations reviewed.

PCEA

Administrative Services Section's meeting scheduled for Phoenix April 7 and 8 at Jokake Inn had to be changed because the 8th is Good Friday. Meeting was shifted to April 6 and 7 and moved to the San Marcos Hotel, Chandler.

Contractors

Peninsula Electrical Contractors Assn. will inaugurate its new officers at an annual dinner-dance Feb. 26 at the Elks Club, San Mateo. Recently elected were Everett Marshall, president, W. T. Kennedy vice-president, Louis Rolla treasurer and Seth Cohn, William Gillard and J. Randall directors. W. J. Varley is managing director.

NECA

Oregon-Columbia Chapter, National Electrical Contractors Assn., with headquarters at 1432 S.W. 6th Ave., Portland, elected J. A. McCoy, McCoy Electric Co., as president for 1955 at its December meeting. S. S. Adams, Electrical Construction Co., was named vice-president; A. R. Johnson, treasurer, and S. I. Jaggar, Jaggar-Sroufe Co., governor. New board members are George Sutherland, immediate past president and governor; Leslie C. Adams, Adams & Rankin Electric; W. M. Graham; Ogden J. Moulton, The Tide Co.; and Harry Golinger, manager, Western division, Lord Electric Co. The Oregon-Columbia Chapter has divisions in Salem, with Clare Vibbert, chairman; Eugene with Lynn Morris, chairman; central Oregon, with Homer Smith of Bend chairman and Longview-Kelso, with Frank L'Amie chairman. Secretary-manager is Laurence C. Rodgers.

East Central California Chapter, NECA, with offices in the Builders Exchange in Fresno, elected Old-timer L. G. Jeffrey its president for 1955. Earl McCrory was re-elected vice-president; Howard Kennett, re-elected treasurer; George Appling, Industrial Electric Co., governor. Directors are Ron Simmerley of Tulare and William Pollock of Fresno Electric Co. Ray Buckley is chapter manager.

Sacramento Valley Chapter, NECA, feted its newly elected officers at a dinner-dance at Hotel Senator, Jan. 18. New president, Rex Moore Jr., was handed the gavel by Paul Benge, who becomes a director and chapter governor. A. J. Naylor, George Foss Co., is vice-president; E. L. Bryant, Collins Electric Co., is secretary and Hugo Becker, Wismer & Becker, treasurer. Past President J. E. Newmarch was the evening's master of ceremonies. William H. Welch is chapter manager. The dinner-dance installation is an annual event for this chapter.

1955 Association Meetings Scheduled

February

22-25—**California Municipal Utilities Assn.**, Hotel Senator, Sacramento.

23-24—**PCEA Administrative Services**, special seminar, Hotel Statler, Los Angeles.

March

7-8—**PCEA Engineering and Operating Section**, Sheraton-Huntington Hotel, Pasadena.

April

5-7—**Electrical Maintenance Engineers Assn.** of So. Calif., conference, University of Southern California, Los Angeles.

6-7—**PCEA Administrative Services Section**, San Marcos Hotel, Chandler, Ariz.

11-13—**Illuminating Engineering Society**, Rocky Mountain Regional Conference, Westward Ho Hotel, Phoenix.

13-15—**Northwest Electric Light & Power Assn. Engineering and Operating Section**, Hotel Davenport, Spokane.

14-15—**IES Pacific Southwest Regional Conference**, Hotel Statler, Los Angeles.

20-22—**Northwest Public Power Assn.**, Eugene.

24-26—**Rocky Mountain Electrical League**, Spring Conference, Shirley Savoy Hotel, Denver.

25-26—**IES Pacific Northwest Regional Conference**, Harrison Hot Springs, B.C.

May

9-11—**Northwest Electric Light & Power Assn. Business Development Section**, Salt Lake City.

11-13—**Pacific Coast Electrical Assn.** annual convention, Sheraton-Palace Hotel, San Francisco.

19-20—**Northwest Public Power Assn.** Engineering and Operating Section, Longview, Wash.

26-28—**National Electrical Contractors Assn.** annual District 6 and 8 conference, Sir Francis Drake Hotel, San Francisco.

June

6-10—**National Industrial Service Assn.** national convention, Hotel Statler, Los Angeles.

13-16—**Edison Electric Institute** national convention, Hotel Statler, Los Angeles.

22-24—**NWEL&PA, Accounting & Business Practice Section**, Hotel Vancouver, Vancouver, B. C.

27-29—**Canadian Electrical Assn.** national convention, Vancouver, B. C.

July

12-14—**Western Plant Maintenance and Engineering Conference** and show, Pan Pacific Auditorium, Los Angeles.

August

15-16—**American Institute of Electrical Engineers**, Hotel Finlen, Butte.

September

11-14—**Rocky Mountain Electrical League** annual convention, Grand Teton Hotel, Jackson Hole, Wyo.

12-14—**International Association of Electrical Inspectors, Northwestern Section**, Ogden or Yakima.

19-21—**International Association of Electrical Inspectors Southwestern Section** annual meeting, Arrowhead Springs Hotel, San Bernardino or Mission Inn, Riverside.

26-28—**National Association of Electrical Distributors**, Empress Hotel, Victoria.

October

1-8—**Northern California Electrical Bureau**, Electrical Exposition, Oakland Civic Auditorium.

November

9-10—**PCEA-Hawaiian Section**, Honolulu.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Why not make it profitable

Despite a seasonal low, combined with poor building weather, the outlook for electrical construction in 1955 is predicted by all the experts to run to the same dollar volume for the year as it did in 1954. At present a good deal of it is in schools, public buildings and works, and residential. But the pace of retail competition in 1955 is bound to stir up a lot of store redesigning, trick lighting, signs—as well as moving to new shopping centers, branch stores, etc. Contractors shouldn't have to act so hungry with such a bill of fare offered. Surely some of the excess nonproductive labor of estimating and bidding—20 to 40 on a job—could be sheared from the overhead and still have enough jobs to go around.

All on the team

Never in history will so much promotion of wiring be done as in 1955. For the first time every segment of the industry has felt the pinch of inadequacy. Even the public is becoming aware and asking for it. It is even willing to be sold. And in all parts of the West the leagues and bureaus are teaming with utilities, the manufacturers' agents and distributors, the contractors and even the dealers in strong promotional programs. Banks and lending agencies are eager for time financing of rewiring and are advertising and promoting terms as good as FHA.

Two big drives

In Pacific Gas and Electric territory—from the Oregon line to Bakersfield—February and April advertising, billboards, bill stuffers, office displays, all promotions, will be concentrated on wiring. Announced to a luncheon of key industry people by O. R. Doerr, v-p of sales, the distributors and dealers gathered their sales people, over 200 of them, Jan. 31 at PG and E auditorium to enlist their sales help. All are to carry the message to everyone they contact.

Spring fever

Union demands for increases so far have been modest but the negotiating season is just beginning. Fresno settled for an increase to $3.25 to bring the scale in line with the area, but without health and welfare. Stockton agreed to carry on with the present scale. Request from the Vallejo local asks for a 10c instead of a 7½c an hour health and welfare (in spite of the good package being bought now by the area for 7½c from California Physicians Service) and an increase of 10c.

Clean house

A leftist purge of the Vancouver, B. C., IBEW Local 213 resulted in kicking 18 members out after a wild meeting Jan. 18 following a top secret investigation by Alfred Terry and Andy Johnston, 10 officials from Washington, D. C. Previously removed was George Gee, business agent and Don Wilson, his assistant. Hearings are to be held by John H. Raymond, Canadian vice-president.

Fire fears

Plastic luminous ceiling panels are apt to be pretty severely restricted for use in schools and places of public assembly as a result of a controversy over the fire resistivity of the plastics as compared to regular plaster ceilings. Indeed the revised version of the San Francisco building code has a new section 2906 which prohibits the installation of plastic ceilings in exits, corridors, stairways and in certain occupancies, such as theaters, schools, nurseries for children, etc. California State Fire Marshall Jacob Yockers, not satisfied with eastern tests, has conducted some of his own and requires the plastic panels be supported on 12x12-in. spacing, ruling out the rolls of corrugated plastic. All of which further takes these lighting systems out of the electrical into the general building regulations.

Growing

Bert T. Heinz Co., Seattle manufacturers' representative, announces the addition of Jack H. Wells, formerly with G-E Supply, to its lighting and quotation department. Heinz handles the Burntex Sanitary Disposer of San Dis Co., Sacramento; LaSalle Products, Inc.; Portland Iron Works; Silvray Lighting, Thompson Electric Co. hangers and jointly with Freeman Scharr, Smoot-Holman Co. Scharr also handles the Jefferson Electric Co. and Tork Clock lines.

Managers change

Simon Halle, well-known electrical contractor and dealer of Colorado Springs, who retired from business last year has been made temporary manager of the Southern Colorado Chapter of NECA to succeed the late Bill Blackmar. . . . And in Nevada Chapter the headquarters is to be moved from Reno to Las Vegas, and Jim Jeffers will remain as manager only until April, when the move is contemplated . . . The San Joaquin County Chapter at Stockton was interviewing candidates for manager to succeed Ed Grogan who resigned to devote his energies to the plumbing and sheet metal associations.

Presidents elected

Emil J. Weber, San Francisco's "Your Electrician," was re-elected president of the San Francisco Electrical Contractors Assn. so fast he couldn't get the word "no" out before it was done. He was also re-elected chairman of the California-Nevada Conference of NECA Chapters and W. J. Varley, manager of the San Francisco association, its secretary . . . In Fresno the East Central California Chapter elected Old-timer L. G. Jeffrey as its president . . . The Peninsula Electrical Contractors Assn. named Everett Marshall of San Carlos as president.

Sponsors

The "Home of the Year" sponsored by the Valley homebuilders Assn. in Fresno is being wired by the East Central California Chapter of NECA. Acme Electric Co. is doing the work for the association. It is located in a new tract in Manchester Park north of the city.

Prepare conference

Top NECA officers met in San Francisco Jan. 15 to arrange for the next Districts 6 and 8 joint regional spring conference. Paul Geary, executive v-p from Washington, met with Wes Grasley, Portland, District 6 v-p, and Phil Robbins, Salt Lake City, District 8 v-p, and with officers of the San Francisco Electrical Contractors Assn. to arrange meeting details. The Sir Francis Drake Hotel was selected as headquarters for the meeting May 26-28. They attended the California-Nevada Conference of NECA Chapters and then went on to the Northwest Conference meeting in Portland.

Won't be idle

August H. Jaeger, retired from Hotpoint as water heater and utility representative, now is agent in Washington for Mitchell Mfg. Co. lines.

Spot light

Contractors' Division of the Spring Fair of Home Ideas put on by San Diego Bureau of Appliances April 22-27 will lay particular stress on lighting—residential, commercial and outdoor garden. To the thousands who visit the fair, this will give ideas for uses at home and in business.

Gassed up

By sewing up a majority of the large home builders, combined with a penalty for a gas line for heating alone, the gas companies have outsmarted the electrical industry in southern California. The popular trend toward built-in electric ranges is being switched to built-in gas. Adequate wiring certainly suffers in such a deal.

New company

Crystalheat Distributing Co. of northern California has been incorporated to distribute this line of radiant glass heating panels, according to R. E. Newman, in order to keep the business separate from the H. S. Tittle Co.'s contracting business. Address is 85 Columbia Square, San Francisco. Territory is northern California.

Hot opportunity

Electric heating opportunities were expounded at two meetings, arranged by Eichorn & Melchior, manufacturers' rep for Markel Electric Products Inc., during the visit of David Markel, executive v-p, to San Francisco and Sacramento. Markel explained the company's sales and promotional material as well as the line of products. In San Francisco T. W. Fuller, domestic utilization engineer of PG and E, told of that company's space heating program and in Sacramento a speaker from SMUD did likewise. The meeting Jan. 18, in San Francisco had about 50 present, and in Sacramento Jan. 20 about 30 present. Lowell Garrison, for many years with G-E and G-E Supply Co., has joined Eichorn & Melchior.

Floor line

A new series of electric baseboard heaters is now being offered by Chromalox, Edwin L. Wiegand Co. Made in 5-, 2- and 1-ft. lengths of heavy-gage steel, they can be fitted to any wall. They are adaptable either to surface mounting or semirecessed installation. Height of the units are 8 7/8 in., depth 2 9/16 in., producing 540 Btu per linear foot, with low surface temperature; UL listed.

Automatic Switch Co., Orange, N. J., announces approval and listing of its midget-size, explosion-proof solenoid valves by UL to meet class I, group D —type VII; class II, groups F and G—type IX; and class II, group E—type IXA requirements. Bulletins giving data are available. **Small but safe**

Walter H. Thompson retired as assistant general lamp sales manager, Westinghouse Lamp Division, Dec. 30. He had been Pacific Coast regional lamp manager for 12 years, a post now held by George B. Mackey. Raymond K. Leonard was appointed manager of South Pacific lamp district, covering southern California, Arizona and Las Vegas, Nev. A former contractor, he joined Westinghouse in 1945, comes from Dallas, where he was manager of the Texas district . . . And Sam G. Hibben, director of applied lighting for the Lamp Division, past president of IES, has retired after 40 years. He had made several trips to the West and was well known here. **Lamp changing**

Lamp Division of General Electric Co. announced a complete reorganization with decentralization of the division and creation of six product or business departments, each headed by a general manager. Any indication of how this would affect Western representatives has not yet been announced. **More likely**

May will be the seventh National Water Systems Month, during which makers of electric water systems, power companies, government agencies, etc., will combine promotion of the benefits of running water under pressure to farm and nonfarm rural families. Contractor-dealers in rural areas should climb on the bandwagon and make this national publicity go to work selling for them. **Get on water wagon**

Los Angeles' new electric code, having had hearings, may soon be approved. Among its provisions are changes in format to follow the National Electrical Code and Electrical Safety Orders; elimination of No. 14 wire for lighting and receptacle branch circuits; provisions for practical wiring methods for 480-v distribution systems. A review of important features is hoped for in Electrical West soon. **Due in June**

A. Neri Inc. of California is a new setup for what formerly was a New Jersey corporation of electrical contracting. President is W. J. Nagel, J. M. Neri is vice-president, and secretary is V. R. Nagel. Main offices are at 678 Hegenberger Road, Oakland. **All Western**

Another "right to work" law has been submitted to the 1955 Utah Legislature. It was one of the hot issues in the 1953 session. The bill would make it an illegal combination to require labor union membership as a condition of employment and would make it an amendment to the state constitution. **Back in the ring**

BullDog Electric Products is introducing Electrostrip, a rigid vinyl plastic strip, that can be hand molded to go around corners and posts and laid along baseboards or any place on the walls. Specially designed and fused receptacle plugs can then be attached at any point along the strip. Raising a lever releases the plug for reuse at another location. It can be wired to existing outlets or installed in new construction. After years of development, it is now listed by UL; available in 250-ft. rolls through electrical distributors; available in ivory, blending with any color scheme. Due to hit the Western market in March. **Plastic strip**

Globe Cable Way is a system of cable troughs in modular sections with side channels and bottom struts and fittings that can be used to support groups of cables and tubing raceways. It is designed for flexibility and easy installation with original strength maintained. **Open wiring**

Fluorescent Fixtures of California will soon move into its modern plant at 352 Shaw Road, South San Francisco. One of the features of the processing will be the Ransburg paint process of which there is only one other in the lighting industry . . . It has also moved its Los Angeles plant to larger quarters at 239 West 31st St. Robert Harte is Los Angeles district manager, Charles Schoolbred, sales manager. **Two new plants**

A new dual-element fuse is announced by Jefferson Electric Co., called Saf-T-Lag, made in a range of 17 ratings. While the company has made these fuses for industrial uses, the new line is developed for household use to permit appliances to start and still provide proper protection to the circuit. They allow a time delay of a few seconds but open instantaneously on shorts. **Allows starting**

Business to be had

Among the new products contractors can sell: Pryne & Co. of Pomona has a new ventilating hood that tilts for cleaning. It is combined with a built-in three-speed fan and light, available in copper, white and stainless steel finishes. . . . Stanthony Corp. of Los Angeles likewise has a new kitchen ventilating hood, finished in baked enamel with an 8-in. fan and two 40-w lamps, pre-assembled and wired . . . Stewart Industries Inc. of Indianapolis has a new multiple-vent roof fan, which pulls from one to three intakes, for home ventilation including kitchen, bathroom, utility room, etc. . . . Ecco, made by Marvin Mfg. Co., has a new low-priced recessed lighting unit with a built-in junction box, specular reflector, Corning Alba-lite glass and chrome-finish frame hinged for relamping. It is made for mass housing in tract homes. . . . A new gimmick that General Electric home heating and cooling department has unveiled is Musitherm, a heat control combining a clock, thermostat and automatic turning on of a radio for morning alarm. The clock cuts down the heat at night, turns it on before arising, then turns on the music to awaken the sleeper . . . Two electrical engineers in San Francisco have an air raid warning device they call Hom-a-lert, to arouse sleepers should an air raid be sounded. Edward Railsback and Harold W. Stewart plan to market it.

Make up any pattern

Leadlight Fixture Co. of Oakland announces a new line of fluorescent units called Multi-Plex. The series is made up in modules, either square or oblong, from 1x2 to 8 ft. A selection of numbers of lamps is also possible. The units are covered with a Plexiglas plastic panel or bowl. They are designed for surface mounting and can be arranged in any number of designs.

Save the trees

Rome Cable Corp. announces a new type of service drop cable designed to withstand the abrasive wear and cutting action of tree limbs. It is called TreePlex. A tight thin sheath of nylon has been added to the polyethylene insulation. The nylon increases the wear resistance more than 50 times. Use of the wire obviates tree trimming or tree guards.

Back to flame tint

In a series of meetings, Sylvania Electric Products has announced a new "Soft-light" lamp, an incandescent lamp with a delicately pink tinted ceramic coating that flatters complexions and enhances the reds, tans and oranges in home decorations. It comes in 75, 100 and 150 w and three-light sizes at a small premium . . . Another new lamp Sylvania announced is a reflector showcase lamp, whose base threads are purposely bumped or distorted to permit the lamp to remain in the desired position after it has been screwed into the socket. It also has a spring contact to allow positioning of the reflector.

Radiation thermostat

Radiant heating systems have long needed a radiant-reacting type of thermostat. White-Rodgers Electric Co. of St. Louis announces such a thermostat for use with radiant cable, glass panel, baseboard, rubber panel types of radiant heating. The thermal element is exposed to the air and radiant effects and operates without clicks or arc flash. It is designed to balance the air and radiant temperatures for a constant-comfort control . . . A similar new thermostat is also offered by Sunwarm Inc. of Kingsport, Tenn.

For long reach

Now there is a long-handled slimline lamp changer, made by S. G. E. Corp. of Inglewood. Made of lightweight aluminum tubing, it has a safety lock by which to hold and manipulate the tubes. Lengths of 8-ft. tubing can be connected up to 20 ft.

Higher cycles

Getting ready for higher frequency fluorescent lighting applications, Bogue Electric Mfg. Co. announces a frequency changer consisting of an induction motor driving a 400-cycle alternator in ratings from 2 to 50 kw. High frequency fluorescent lighting is flicker-free and stroboscopic effect is eliminated. Likewise the brilliance of the lamps can be varied over a wide range. Dimming is accomplished by switching smaller capacitors in series with the lamp.

Sell the flair

Lightolier announces a new portfolio to aid in selling its modern luxury type of lighting fixtures, entitled "Lighting With That Lightolier Flair." It is aimed to make the sale of lighting fixtures profitable to contractors.

Caters to architects

F. W. Wakefield Brass Co. has issued a new catalog in 10 sections, designed by Architect John Terence Kelly, Cleveland. It features the modular materials and equipment given the Greek-letter names Sigma, Beta, Omega. There is also a section on the Wakefield diffused-lighting ceiling, as well as the suspended types of commercial and industrial fixtures. All are contained in colorful portfolios with appropriate AIA file numbers.

ELECTRICAL WEST

Sales Guide

News Letter

February 1955

FOR THE ELECTRICAL MERCHANT OF THE WEST

One of the largest crowds in its history attended the San Francisco market in late January. The buyers were there and were writing orders—more than at any time since the outbreak of the Korean war. There was a general feeling of optimism, coupled with an awareness that competition would be keen and a tendency to speculate on the effect of built-ins and the problems of discounters and price-cutting. Details will be held until next month but here are a few highlights.

Market lively

Noting the prediction that major appliance sales will increase by 10% in 1955, Vale E. Freeland, Westinghouse Appliance Division, Mansfield, a speaker at Monday's press luncheon, warned against complacency, suggested hard work and more punch "in everything we do." Citing some of the things manufacturers are doing to obsolete old models and build greater market for high saturation appliances, he said that they were looking to the retailer to back them up with a sound trade-in program, managed by an experienced man who knows how to recondition appliances so they can be sold profitably.

Sound trade-in

Here from Norfolk, Va., to speak at the Radio-TV and Appliance dinner, Harry Price, national president of NARDA, had some pertinent things to say to retailers at a special NARDA luncheon. Associations have no magic formulas, he said, they are worth the time and money each dealer puts into them, no more. But he told how a dealer group in a 400,000 trade area is forcing a discount house to the wall. We're going to have discount houses, he said, but we're going to learn--or be left by the wayside. Built-ins and color are opening up new horizons, he thinks. They are a bigger challenge than discount houses but they put us back in specialty selling, he reminded the group. "How could a discount house handle built-ins?"

No magic, hard work

Some of the new things: Built-ins and color played a big role, if not in actual display in blueprints and announcements. Chrome and stainless steel were more in evidence. Hotpoint was showing a Customline refrigerator with chrome finish that can be built in, along with a range ensemble; these with matching sink and dishwasher can be financed together. . . Lavenson & Savasta displayed a Thermador console range with stainless steel top, white or grey procelain sides. . . Westinghouse had a preview model of its built-in range, with stainless steel and chrome finish, was demonstrating its refrigerator with twin-juice dispenser; the new rotisserie for use separately or with the roaster; a 17-in. TV with patio cart. . . J. J. Lukanish had a new Gibson Strat-a-zone refrigerator, with four cold zones for different types of foods.

New models

The Frank Edwards Co. was in its new and larger quarters in space 400, opened just before the market; announced that it will build a $1,000,000 warehouse and office building this year in Millbrae, 20 minutes from downtown San Francisco.

New quarters

Generally strong buying was reported at the Los Angeles Lamp & Picture Show, although weather brought a 6% drop-off in attendance. The trend was toward indoor-outdoor lighting for use in patio, garden and poolside illumination.

Buying strong

Introduced at Frigidaire's 1955 Road Show presentation (story next month) was a built-in range to be available about April 1; design incorporates sectional surface cooking units that fold back out of the way and an automatic wall oven with two vertical doors. Also in the 1955 line are an automatic dishwasher and a food waste disposer; ranges with automatic controls on surface units, oven and deep-well cooker; refrigerators with a "picture window" vegetable Hydrator in the door; a color choice of yellow, green or white; room air conditioners for casement as well as double-hung windows, with easy installation features.

1955 features

Fresno's meeting of the PCEA Business Development Section saw a recharged ambition to sell not only from the So. Cal. Edison group, who had just had the starter stepped on by President Quinton and were warming up to go but PG and E too, with V-P Rod Doerr recruiting the entire industry to tackle the competitive year ahead. Major appliance front would seem to be with home builders, both to up the wiring and lighting and also get the tract homes electric-applianced. Home Econ gals plan some dealer personnel sales and demonstration training that smart dealers shouldn't pass up. There'll be lots of help from the utilities this year in ads, promotions, contests, training and--the works.

Lots of help

Shows coming up: Los Angeles Home Show, June 9-19, Pan Pacific Auditorium, will be sponsored by 14 construction industry associations and Chamber of Commerce; will include model homes, new products, building materials, appliances and home furnishings. . . First Annual Home Laundry Service Seminar and Trade Show, May 18-20, Cosmopolitan Hotel, Denver, in conjunction with 16th annual convention of Appliance Parts Jobbers Assn. . . Western Electronics Show at Civic Auditorium, San Francisco, Aug. 24-26, sponsored by West Coast Electronic Manufacturers Assn. . . Mentioned before: San Diego Bureau's Spring Fair, April 22-27, Balboa Park; Northern California Electrical Bureau's Electrical Exposition, Oct. 1-8, Oakland Auditorium.

Shows coming

EEI's 21st annual sales conference will be held March 28-31 at Edgewater Beach Hotel, Chicago, O. R. Doerr, PG and E and chairman of commercial division executive committee, announced. Starting with a full-day home service meeting, it will continue with group meetings on selling for commercial, farm, industrial and residential markets, speeches on business conditions, lighting, air conditioning, wiring and appliances.

Sales conference

Among bills to be introduced in the California Legislature are those to govern discount and cost plus sales and a proposed state license for home appliance dealers. . . Electric League of Los Angeles is polling its members on the licensing law.

In the hopper

As a follow-up to Operation Snowflake, U. S. Steel will launch Operation Wife-Saver, a nation-wide sales promotion program pushing all-steel kitchens. The campaign will have its peak during the spring building and remodeling season in late April and May; will urge use of steel for all kitchen equipment, including appliances and water heaters.

Follow-up

Although interest in color TV is slowing, RCA and Columbia are planning to continue color programs throughout the year. . . RCA reduced price on its 21-in. color picture tube, a move which was greeted generally as a step in the right direction. . . According to the most recent survey made by Woodbury College of Los Angeles for Admiral, a majority of present TV owners are in no rush to buy color sets at today's prices; are waiting for compact 21-in. screens with a price tag somewhere between $300 and $500. . . Despite appearance of a specially designed TV receiver in the 1955 version of its Kitchen of Tomorrow, Frigidaire says it has no intention of getting into the television or radio business. . Termination of negotiations on a possible merger of Hoffman and Packard-Bell was announced.

Color TV

Westinghouse announced it would fair trade its portable appliances at wholesale level; started signing fair trade agreements with California distributors stipulating that fair trade wholesale prices will be observed in selling to retail dealers. . . Both Westinghouse and G-E won temporary restraining orders in California courts against various government employee associations and dealer organizations for violations of fair trade. . . In Stockton Charles Hawkins, operator of Bigg & Littel Appliance Stores, was fined $200 for defying a permanent injunction against selling Westinghouse appliances at less than fair trade prices; was reported as stating that he preferred jail to paying the fine. Hawkins' motion for a jury trial was denied. . . In Los Angeles a move by some department stores to cut prices on electric housewares was met by Barker Bros. with the announcement that it would meet all price cuts but would not advertise them.

Fair trade

Will it spread to appliances? For the rest of 1955 General Motors will repurchase or arrange for repurchase of new and unused passenger cars considered "excess supply," in an effort to help eliminate bootlegging.

Is it a trend?

Hoover distributors may now set the retail price on Hoover washers in their areas. This announcement last month was accompanied by a reduction in factory price to the distributor of nearly 17%.

May set retail price

An additional dealer profit plan announced by Norge will apply to all of its appliances bought from an authorized distributor between Jan. 1 and June 30, 1955. Norge will save for the dealer's account 2% of the cost; will make payment in one check shortly after June 30.

Profit plan

McGraw Electric has bought the Coolerator Division of International Tel & Tel. . . Dormeyer Corp. reportedly will introduce a toaster sometime this spring, to be made by Camfield and to retail for about $20. . . G-E has reorganized its small appliance division into four departments: automatic blankets and fans; vacuum cleaner, all headquartered in Bridgeport; and the clock and timer department, Ashland, Mass. . . Norge has realigned its sales organization into five divisions. Western headquarters are at Los Angeles and R. H. (Rube) Pizor is Western s-m.

Manufacturer briefs

In Hawaii Kilsby Refrigeration Co. has been made territorial distributor for Bendix TV. Herbert W. Stielau is general manager of Kilsby. . F. B. Connelly Co., Seattle, has been made independent distributor for G-E's new C-3 roll-around vacuum cleaner. The Lewyt franchise, recently released by Connelly has been taken by Fidelity Electric Co. in Seattle. . . Hoffman has gone into the Denver territory with appointment of Independent Distributors Inc. to handle its full line. . . Sues, Young & Brown, Los Angeles, and Hollywood Wholesale Co. are now distributors of G-E electric blankets in addition to Gough Industries and GESCO.

Changes

More changes

Admiral Distributors at Spokane, a newly organized company, has taken over distributorship of Admiral appliances in the Inland Empire. Manager is Herman S. Albert, who was with Salisbury Distributors, former holder of the franchise. . . Roto-Broil has added four reps in its Western Division: James B. Harnes, southern California and Arizona; David G. Bryant, northern California and Nevada; Kenneth M. Rader, Washington and Oregon; Morey White, Rocky Mountain. . . Ray Thomas Co. of Los Angeles has announced that it is dropping its kitchen and appliance division and will spend full time on Columbia records, players and equipment. It had held the Youngstown, A. O. Smith and Permutit franchises.

New quarters

Nides General Electric Appliance Store in Denver is opening a warehouse at Eighth & Santa Fe across the street from its second store. The new quarters give space for a three-month stock.

Sold interest

Lou Dahl has sold his interest in Dahl-Conger Inc., Denver Capehart-Farnsworth distributor. John Conger, former v-p, now assumes general management. Dahl is going back with Larson Distributing Co., Crosley-Bendix distributor.

Utility changes

Changes in sales staff were reported by two Western power companies. Southern California Edison Co. made Harold Moore, manager of right-of-way and land department since 1948, general sales manager, a new post; T. L. Van Law, manager of industrial and commercial sales; J. C. Meserve manager of residential sales. G. R. Haysel is now Edison advertising manager, succeeding Howard Hayes, who was made Redlands district manager. . . Puget Sound Power & Light made Clarence Scheyer its general sales manager and announced it will increase its sales organization substantially. Scheyer had been industrial sales director since 1947.

About people

Two new district managers, portable appliances, were named by Westinghouse--Lloyd Dillon in Colorado, New Mexico and Wyoming: Robert L. Allen for Utah, Idaho and Montana. . . John Charlesworth, former Hoffman Western division sales promotion rep, will head a new Bay Area sales promotion division for the line. Clarke Latimer, formerly in Los Angeles, is new service manager for Hoffman Sales Corp. . . F. K. Graf, manager of GESCO's Fresno office, joined Hotpoint in Dallas; P. J. Drieci became manager of consumer goods and N. F. Clark, supply sales manager, at Fresno. . . Pete Pierre has joined the Frigidaire sales staff at Sacramento. . . Dick Reed is in charge of G-E small appliance promotion for GESCO in Sacramento. . . J. G. McKinley has been made Pacific region contract sales manager, Westinghouse Appliance Division.

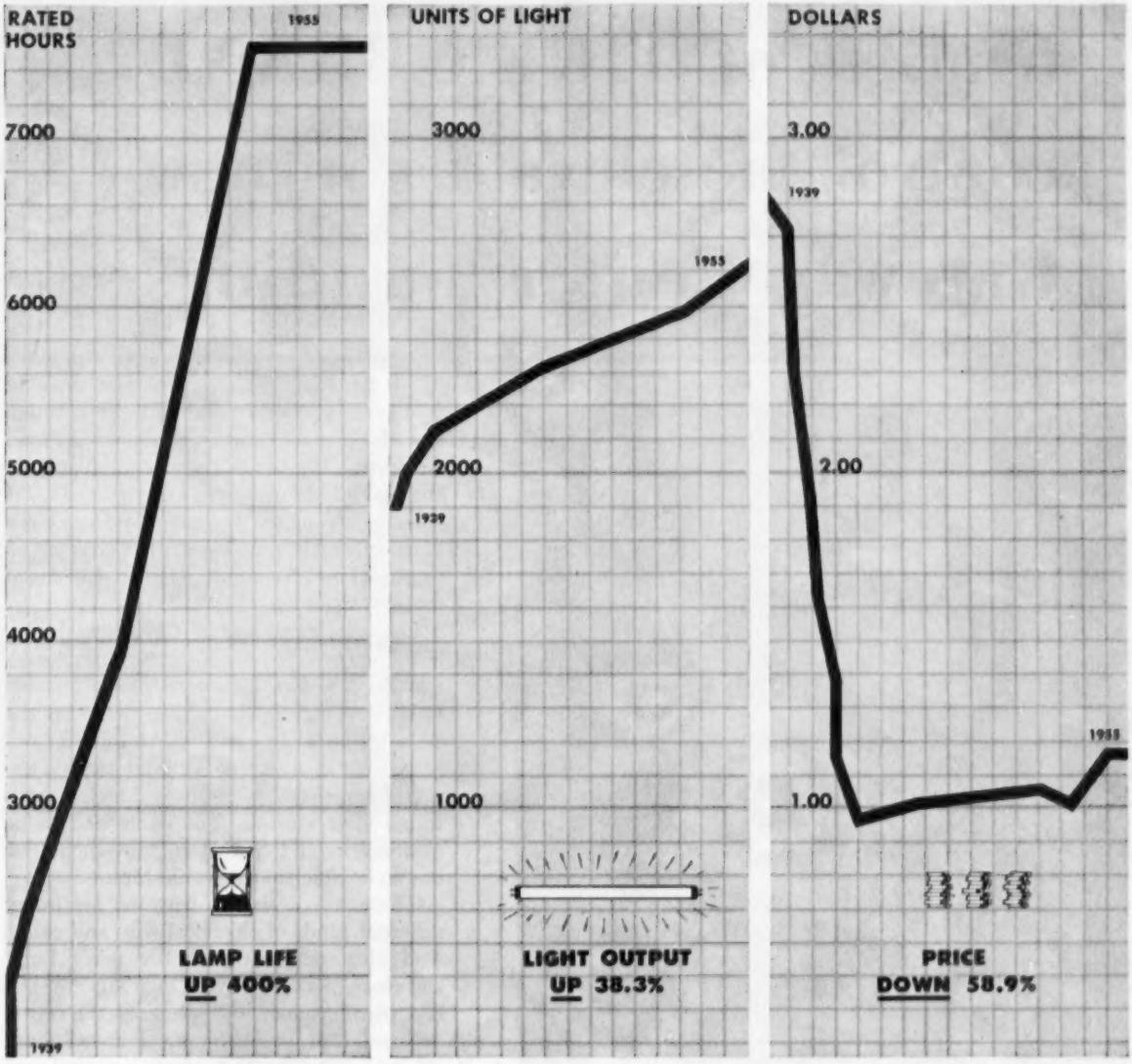
Western winners

Winners of contests and awards in the West: Carroll Shepphird of Beverly Hills and the Chamber of Commerce were second prize winners in G-E Lamp Division's Christmas lighting contest. . . Horn & Cox of Los Angeles won two major prizes in Raytheon's contest: the Henry F. Argento merit award for wholesaler selling and the sales manager competition, taken by Clarence Fink. . . Western Appliance Corp. of Denver won the John A. Hurley award for distinguished merchandising achievement during the recent Whirlpool distributor convention in Chicago.

Prizes coming up

Among incentive plans announced by manufacturers: a 90-day "Dough for Demonstrations" program for Hotpoint's home laundry section, with cash, special trips, increased sales potentials offered. To participate a dealer must install a 1955 washer and dryer and stock an extra unit of each. . . Bendix Selling Bee from Jan. 15 through April 15, with more than a thousand prizes and a selection of vacation trips. . . Alex Lewyt Month, Jan. 24 through March 5, with trophies. . . Carrier Corp.'s First Hundred, with room air conditioners as prizes for winning salesmen.

YOU EXPECT THE BEST VALUE FROM G-E FLUORESCENT LAMPS



16 times more value for your fluorescent lamp dollar than in 1939

Today you don't have to pay more than $1.15 for the finest fluorescent lamp made: General Electric. Sixteen years ago it would have cost you $2.80 or $1.65 more. And while price has been going down, we've been pushing quality up. General Electric has upped light output 38%, increased lamp life 400%.

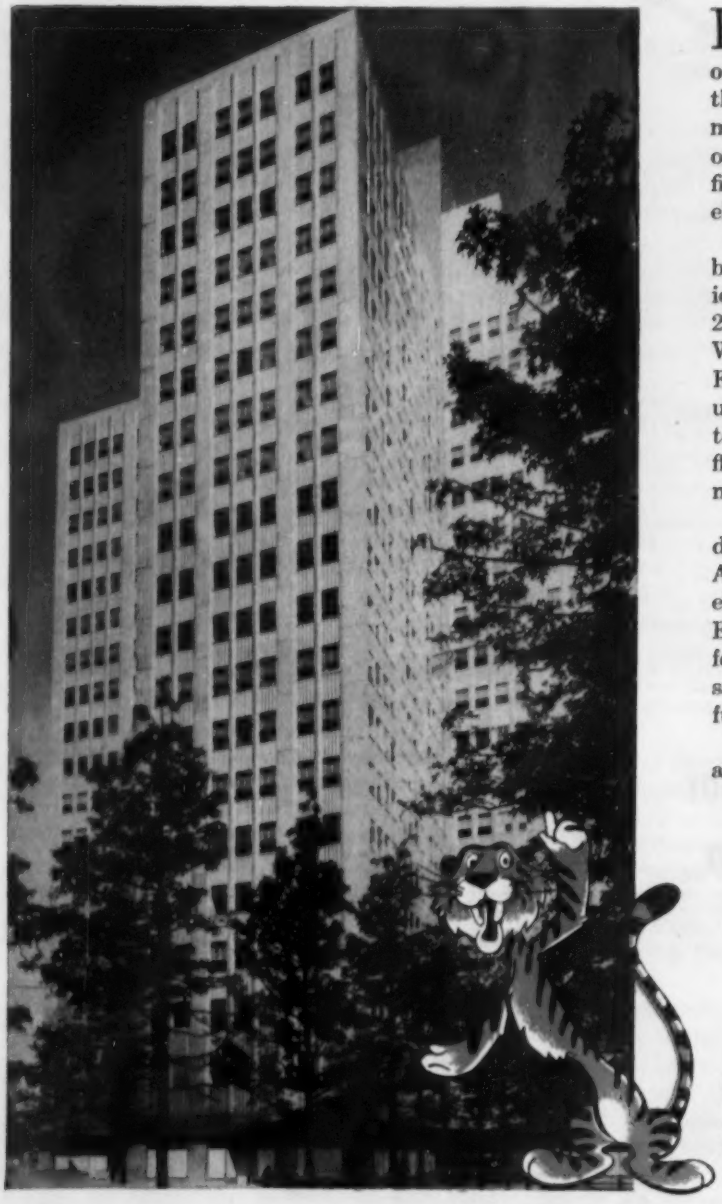
In terms of what you really judge lamps by, a General Electric 40-watt fluorescent lamp that lists at $1.15 today is a *16-times bigger value than it was in 1939.*

For further information, contact your G-E lamp supplier or write to Lamp Division, General Electric, Department 166-EW-2, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC

6 miles of TIGER BRAND control the elevators in new Gateway Center buildings



ELEVATOR CONTROL CABLE leads a tough life. It must be light, to reduce the load on the car. It must be flexible, to withstand the continuous movement and vibration. It must be strong, to prevent the long length of cable from tearing itself apart. It must be fire-resistant, to guard against disastrous elevator shaft fires.

For the magnificent Gateway Center buildings in Pittsburgh, shown here, American Steel & Wire furnished some 6 miles of 20 and 30-conductor control cable for the Westinghouse Selectomatic elevators. Flame-resistant insulation and jackets are used, and each cable is reinforced with tough steel strands. The cable had to be flexible enough to withstand movement, but not so flexible that it would kink.

These are desirable features for many different kinds of electrical wire and cable. And although you probably don't build elevators, you can rely on any Tiger Brand Electrical product to combine all the subtle features that make for easy installation, safe, reliable operation, plus a long and useful life.

Send the coupon for more information on any Tiger Brand product.

AMERICAN STEEL & WIRE DIVISION,
UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
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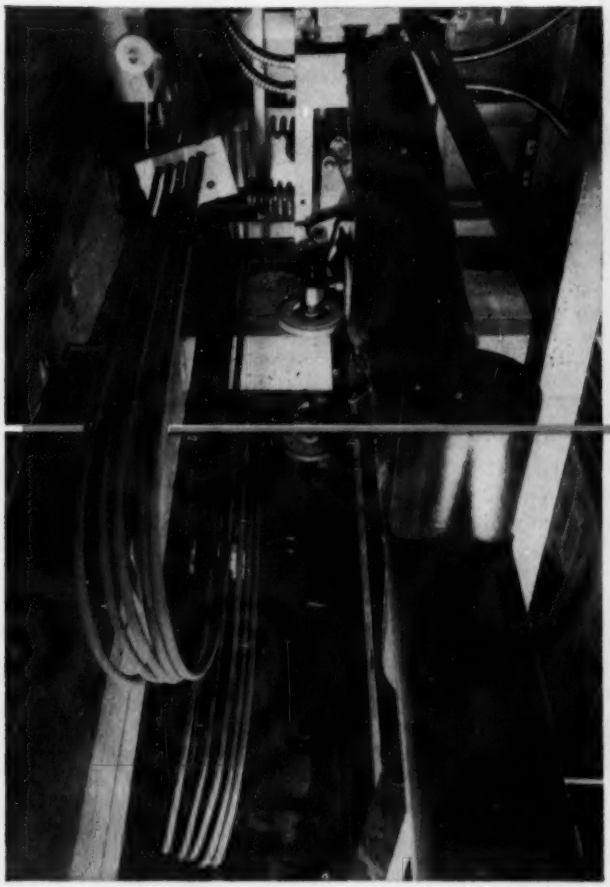
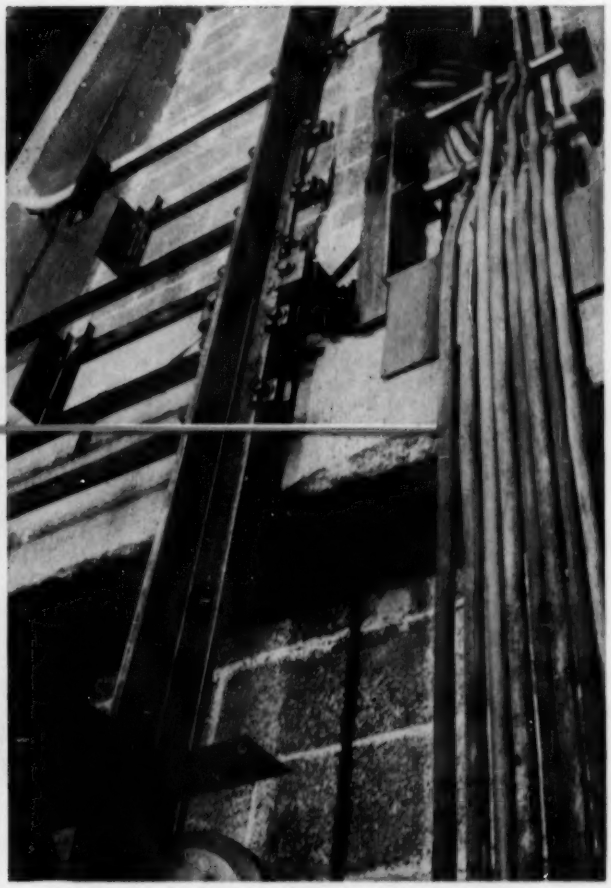
PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.,
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Gateway Center, famous Pittsburgh landmark, where Westinghouse Selectomatic Elevatoring matches calls, cars and floors to put elevators where they're needed, when they're needed.



Tiger Brand control cables are at the left. The hoist ropes, visible at right, are also made by American Steel & Wire.



Control cable terminal box is located half-way up the shaft. Flat steel rods projecting from elevator track actuate induction coil on car to control automatic leveling system.

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB!

paper & varnished cambric cable
asbestos wire and cable
aerial, underground & submarine cable
shovel & dredge cable
mold cured portable cord
machine tool & building wire
special purpose wire & cable

SEND THE COUPON

American Steel & Wire Division
Room JE-25, Rockefeller Building
Cleveland 13, Ohio

Please give me more information about Tiger Brand cable for .....

Name .....

Firm .....

Address .....

City ..... State .....

USS Tiger Brand ELECTRICAL WIRE & CABLE USS

UNITED STATES STEEL

THE MONTH IN BRIEF

State Lawmakers Study Power Bills

Power was a much discussed subject in state legislatures of the West last month. A few of the bills put into the hopper are reported here and on p 144.

Property Valuations in Oregon

Oregon's private utilities would have their property valuations for tax and rate purposes determined by one agency and a single assessment base would be used for both under a bill introduced in the Oregon Legislature by Sen. Monroe Sweetland, Milwaukie Democrat. Sweetland also introduced legislation to make the state public utilities commissioner an elective instead of an appointive post.

Surcharge in Washington

A 5% surcharge on electric, gas and water bills may be imposed in the State of Washington, if the legislature follows a suggestion of Gov. Arthur B. Langlie. The tax would raise an estimated $10,000,000 annually, half the additional amount the state is said to need.

Memorial Calls for Partnership

A memorial to Congress approving partnership development of Green Peter and Cougar Dams in the Upper Willamette Basin was passed by the Oregon House 44 to 16. Awaiting action at last report was a second memorial asking Congress to declare its intent to build John Day Dam with federal funds or to allow local agencies to proceed.

Resolution Loses

A resolution to put the Washington State Legislature on record as opposing a license for Idaho Power Co.'s Hells Canyon development was referred to the committee on public utilities, where it is expected to die. The resolution was introduced by Sen. Albert D. Rossellini, Democratic floor leader; was opposed by Sen. William D. Shannon, who contended that the body was not qualified to discuss technical aspects of a question that had been before FPC for many months.

Project Financing Studied

In California Gov. Goodwin J. Knight asked the state legislature to take immediate steps to determine the most effective way to finance and construct the $1.2 billion Feather River project, first proposed four years ago.

Upper Colorado Project Enlarged

The Upper Colorado River Project, after rejection by the 83rd Congress, will return this year bigger by $275,000,000 than it was previously. Western Senators will introduce legislation with the Curecanti and Juniper power and storage dams added, along with 18 more Colorado and two Wyoming irrigation projects. Commented George Clyde, Utah member of the Upper Colorado Commission, "This may break the camel's back. With these additions you are going to run the cost of the project up to $1,750,000,000. That's a bigger bite than Congress has ever permitted before." The additions were proposed by Gov. Ed C. Johnson of Colorado and approved by commission members from Wyoming, Utah, Colorado and New Mexico.

Compromise on Commission

Shortly after a bill to abolish the Washington State Power Commission had been introduced in the state legislature by John G. McCutcheon, Tacoma Democrat, chairman of the house public utilities committee, a compromise measure was brought forward. The new bill would prevent the commission from competing with other public or private power agencies and would permit three or more cities to form an operating agency to provide for generation and transmission of power.

Funds Asked for Priests Rapids

Meanwhile Governor Langlie asked the Washington body to appropriate $1,000,000 for the State Power Commission to finance engineering and other costs preliminary to construction of Priest Rapids Dam on the Columbia River. Grant County PUD is planning to apply by July 1 for a license to build the dam (it already has a preliminary license) and may ask approval of two low dams instead of a single high dam. The governor is quoted as saying that he believes the $325,000,000 project too big for the PUD.

High Court Rejects Motion

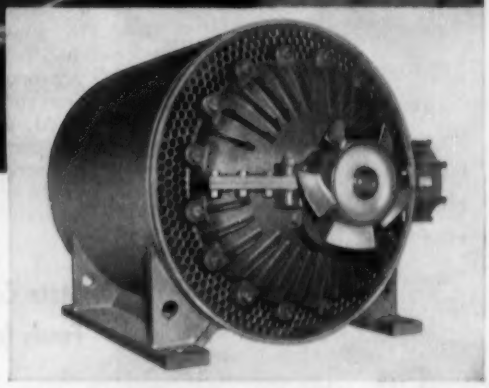
Washington Water Power Co.'s motion to prevent condemnation of its Chelan hydro plant by the Chelan PUD was rejected by the Washington State Supreme Court. The court said it duplicated a motion filed in 1953 and rejected.

Negotiations Ended

Negotiations for sale of Stevens County PUD properties to Washington Water Power Co. have been broken off and PUD commissioners report that they plan to resume a condemnation suit against company properties in the area. A 1948 jury set valuation of $2,500,000 on the facilities and the PUD dropped the suit. WWP reportedly offered some $2,000,000 for the PUD facilities during recent discussions.

FPC Defers Action

FPC deferred action on a motion to dismiss Idaho Power's three-dam application for Hells Canyon. The commissioners said they would not rule on the intervenors' motion until all evidence is in; that it requires a final decision. Time for filing reply briefs was extended beyond the Jan. 10 date to make up for time spent on the dismissal motion.



3600-rpm explosion-proof motor with fan housing removed to show unidirectional fan.

These heat exchanger tubes

Protect this motor from dirt and corrosion

COOLING AIR is carried through the heat exchanger tubes with sufficient velocity to expel practically all kinds of dirt. If oily or sticky dirt should cling, tubes can be ramrodded clean on the spot in a few minutes because tubes are straight and tube ends are exposed. Also, the tubes are distributed uniformly around the perimeter of the stator yoke and along its full length — cooling all parts of the motor evenly.

Choice of Corrosion-resistant Materials

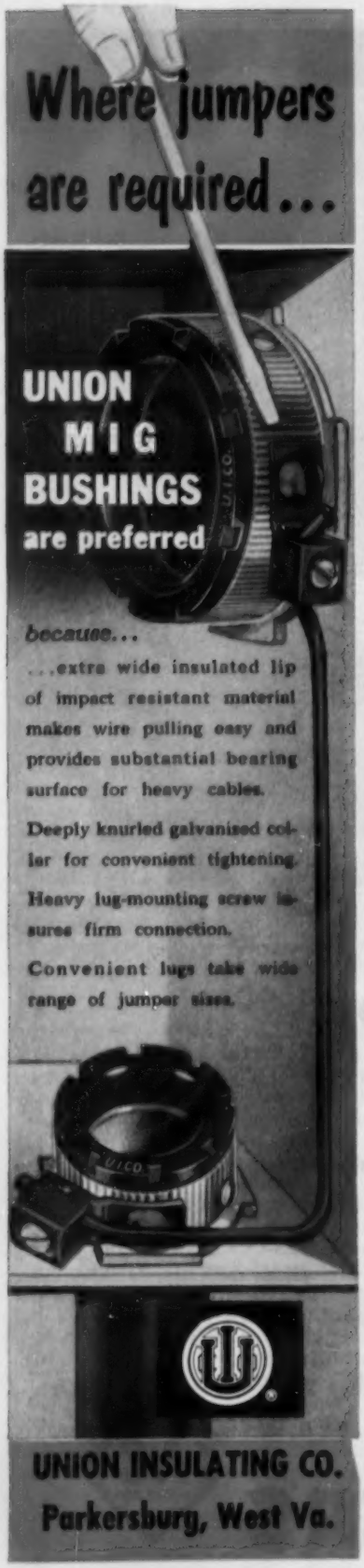
You can lick corrosion with this motor, too. Tubes are available in a variety of materials to meet practically any corrosive atmospheric condition. Allis-Chalmers tube-type motors have long and successful experience in such difficult applications as caustic plants, refineries and petrochemical plants, power plants with fly ash problems and many others.

Get Complete Information

Next time you need a motor for a dirty or corrosive location or for outdoor operation in all kinds of weather, call your Allis-Chalmers District Office. Get complete information on Allis-Chalmers tube-type totally-enclosed, fan-cooled and explosion-proof motors. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7149. Available in ratings on frames larger than NEMA 505 up to 3000 hp.

A-4559

ALLIS-CHALMERS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because...
...extra wide insulated lip of impact resistant material makes wire pulling easy and provides substantial bearing surface for heavy cables.
Deeply knurled galvanized collar for convenient tightening.
Heavy lug-mounting screw insures firm connection.
Convenient lugs take wide range of jumper sizes.
UNION INSULATING CO.
Parkersburg, West Va.

THIS MONTH'S NEWS

Utility Tax Transfer Proposed in Arizona

Tax assessments of electric and gas companies would be transferred from the counties to the state under an Arizona Tax Commission recommendation to the legislature.

If approved, properties of gas and electric companies would be assessed by the corporation commission on the same state-wide basis as mines, railroad and wire communications utilities.

At present, electric and gas utilities are evaluated for tax purposes by county assessors and the extent of taxes is limited by the needs of the particular county or school district.

Under the revised setup, school district taxes throughout the state would be affected with each county allocated a proportionate share of over-all holdings for tax purposes.

At present assessed valuation on electric and gas properties is not distributed back to the various school districts in proportion to the revenue obtained from such a district.

State Commission Asks Funds for Plant Design

Washington State Power Commission will ask the state legislature to appropriate $275,000 as a loan to engage engineers to design two 150,000-kw steam plants, estimated to cost $45,000,000.

Construction would be financed by sale of revenue bonds, according to J. Frank Ward, managing director of the commission, and work would begin within two or three years.

The project would be planned for an eventual eight units.

Action on John Day Urged in Oregon

Oregon's Governor Paul L. Patterson has called upon his state's legislature to ask Congressmen for action on the John Day hydroelectric site on the Columbia River—"that they either declare their purpose to go forward at once with the construction of this dam itself, or that they make suitable arrangements to cooperate with the local agencies—public and private—who are willing and able to go forward with that dam now."

In his inaugural address Patterson recommended the Oregon lawmakers pass a memorial to Congress urging the present construction schedules for power phases of Chief Joseph, McNary and The Dalles power houses be maintained to meet regional kilowatt requirements.

The governor also urged planning funds be made available for John Day at once and called for the U.S. to "proceed with the construction of its portion of the Cougar Dam on the McKenzie River and the Green Peter Dam on the Santiam River . . ." for which local interests have offered cooperation.

District Seeks Approval On Construction Bonds

Sacramento Municipal Utility District has asked the California legislature to give its approval to a bill to permit SMUD to issue revenue bonds for the construction of an $80,000,000 hydroelectric power development project on the upper American River.

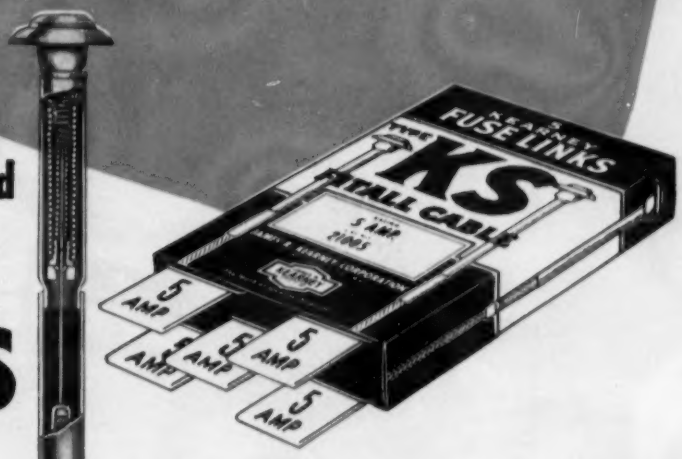
In another measure, SMUD would be authorized to pay in lieu taxes to the city and county of Sacramento in which the district operates. The municipal utility pays no property taxes now but, as a gesture of cooperation with the local governments, offered to make an in lieu payment if authorized by the legislature.

• **Pacific Gas and Electric** Co. has received approval of the California Public Utilities Commission to build a 50,000-kw steam plant at Buhne Point, four miles south of Eureka, Calif. Cost of plant was estimated at $9,000,000. Its design will facilitate addition of three units.

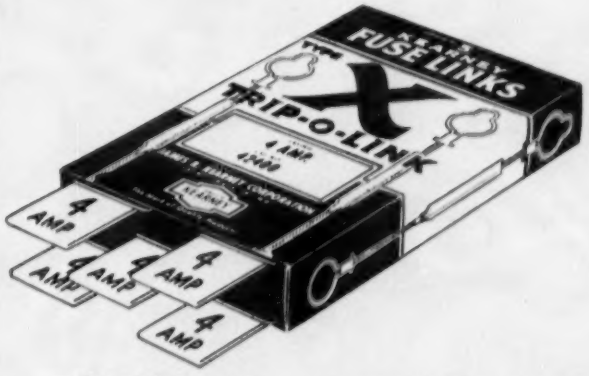
• **Hilo, T. H., Electric Light** Co. has started installation of a $2,000,000 7,500-kw steam power generator to supply power for newly acquired service areas outside Hilo, Kau and at Kohala. The generator is being installed by Bechtel Corp.

• **California Electric Power** Co. celebrated its fiftieth anniversary Dec. 31. The company has more than $80,000,000 invested in facilities in three counties in western Nevada and in Mono, Inyo, Kern, Riverside and San Bernardino Counties in California.

Each Outage is one too many!



KEARNEY Type KS . . . specially designed to protect and still keep outages at a minimum on circuits subject to switching and lightning surges.



KEARNEY Type X . . . specially designed to keep transformers in service during overloads and surges . . . yet to protect before the damage range is reached. Opens 230% of rated current load within five minutes.

These closely co-ordinated KEARNEY FUSE LINKS prevent unnecessary blowing

For a smooth functioning, customer pleasing system, you may need more than just "fast" and "slow" fuse links. These Kearney *Specialized* links have precision matched time-current characteristics to prevent unnecessary interruptions . . . and, at the same time, protect your equipment.

ALL KEARNEY FUSE LINKS . . . including EEI-NEMA Standard Types . . . are color-coded to save time and prevent mistakes. They are packaged for easy handling and engineered with the accuracy you need for effective co-ordination. Time-current curves are available to help you work out your coordination.

276

For Better Construction . . . Safer Maintenance

JAMES R. KEARNEY

Specify **KEARNEY PRODUCTS**

The Mark of Quality

MAYDWELL & HARTZELL, INCORPORATED • WEST COAST DISTRIBUTORS • Los Angeles • San Francisco • Portland • Seattle • Spokane • Phoenix

Helping the industry meet its growing loads

Designing transformers to measure ever higher voltages

"Will it be possible to measure tomorrow's higher voltages on a practical basis?" As recently as one year ago, utility management did not have an answer to that question.

Today, it can be answered—in the affirmative—with assurance. The highest voltage potential transformer ever built—for 330 kv—is tangible evidence.

This tremendous unit would have been even larger—perhaps impractical without the sound basic design made possible by over twenty years of utility co-operation and continuing high-voltage research. This work has resulted in various important developments many of which have been Westinghouse "firsts" for the industry. To name just a few—

Oil-filling under vacuum was first introduced by Westinghouse to assure full impulse strength the moment the units are placed in service. This practice has been accepted as a standard of the industry.

Quality-control impulse testing was another Westinghouse innovation which has been highly successful in improving the reliability of instrument transformers in general.

Hipersil® for transformer cores, still a Westinghouse exclusive, is a highly permeable, grain-oriented silicon steel, which makes possible substantial reductions in transformer size and weight.

All of these research results, plus the vast storehouse of application knowledge accumulated by Westinghouse engineering over the years, have their place in the practical measuring of tomorrow's higher voltages. They are proof of the continuing objective at Westinghouse to provide utilities with equipment which will continue to aid them in successfully meeting their growing loads. J-97181

YOU CAN BE SURE... IF IT'S

Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

Largest potential transformer built!

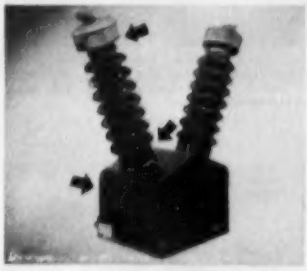
The Westinghouse Type VP potential transformer—the largest ever built—illustrated at left is for operation on a 330-kv, 3-phase, 60-cycle system. It is 26 feet high, weighs 41,000 pounds and covers a projected floor space of 92″ by 88″.

This tremendous unit would have been much larger physically without the basic design features proved in lower rated units and the continuous research into high-voltage applications. In addition, other basic design features include:

Interchangeable bushings

Condenser bushings on VP potential transformers (25 kv and higher) are interchangeable with those used on power transformers of the same voltage class. They give high mechanical strength—high puncture strength—with relatively small size and weight.

Hermetic sealing



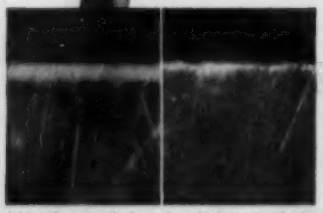
Porcelain weather housing of bushings is solder sealed at the cap and flange. High-voltage bushing flanges are welded to the tank. All tank seams are arc welded. The security of all joints of the complete vacuum filled assembly is then proved by an oil-pressure test.

This "hermetically-sealed" construction assures sustained transformer accuracy necessary to the reliable measurement of high voltage at any level.

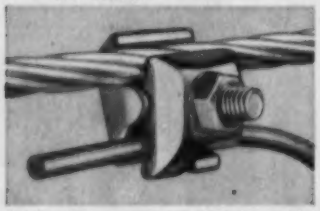
For more information on the most complete line of instrument transformers on the market, call your nearby Westinghouse representative or write direct to Westinghouse Electric Corp., 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

Protect your conductor with

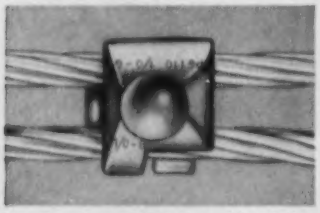
THE CLAMP THAT'S AHEAD OF THE TREND



Micro-photograph shows how high-density fortified cadmium, applied to a thickness of .001" on Chance AGP Clamps, compares with commercial plating at right.



Overlapping contacts on one side and a straight slide-in groove on the other help the attachment of the tap to the line.



Top view of clamp shows extra wide gripping jaws that contact all outside conductor strands in the entire size range.

Connecting copper and aluminum conductor requires a general purpose connector as good as the conductor itself in conductivity, mechanical stability and corrosion resistance, if future trouble on the line is to be avoided.

The best connector for this purpose is an aluminum bodied clamp with a *properly applied coating* of high density, fortified cadmium, proved best by every test for long-lasting, troublefree, general purpose connections.

That's what you get in the New Chance AGP Parallel Groove Clamp, companion to the widely tested and accepted Chance AGP Tap Clamp. The Chance PG110, shown above, can be used for any combination of aluminum or copper in a size range 1/0 ACSR to No. 6 copper *both sides*. This clamp is heavy in construction—yet light in weight. The high tensile strength bolt swivels into position without binding or bending. The wide jaws of this clamp contact every strand of any conductor in the entire size range. Rounded edges protect the conductor against damage from vibration.

Chance PG110 is your universal clamp for most applications. Larger sizes with the same features are also available. Write for complete information.

*Aluminum General Purpose

ABC INDUSTRIES

A·B·CHANCE CO·

CENTRALIA, MISSOURI

SAN FRANCISCO, CALIFORNIA

COMMITTEE SIGNS COLUMBIA COMPACT

The future of the Columbia Interstate Compact now lies in the hands of Congress and the legislatures of the various states involved in the proposal.

Negotiators of the compact completed their work and signed the document at Portland, Jan. 15. To be effective the compact must be ratified by the four principal states, Idaho, Montana, Oregon and Washington, and also approved by Congress.

If approved, the compact will establish an interstate commission with broad recommendatory powers on any major project proposed for the Columbia and tributaries in the U. S.; to prepare and submit plans for development of water resources and resolve conflicts between the states, particularly water rights and power allocation.

The commission would be composed of two commissioners each for Oregon, Washington, Idaho and Montana; one each from Nevada, Utah and Wyoming, who may participate if their respective legislatures approve the compact, and a nonvoting chairman representing the federal government.

Compact commission chairmen signing the document at Portland were: J. V. Rogers, Washington; Charles H. Heltzel, Oregon; Lloyd I. Wallace, Montana; R. P. Parry, Idaho; Hugh A. Shamberger, Nevada; L. C. Bishop, Wyoming, and Frank A. Banks for the federal government. Utah's commission chairman, George D. Clyde, was delayed en route but notified the commission's executive secretary, H. Calvert Anderson, he would sign later.

Utility Withdraws Purchase Offer

California Electric Power Co. has withdrawn its offer to purchase the Riverside, Calif., Municipal Department of Light, pending a study aimed at presentation of a plan "more advantageous to the city and its taxpayers."

CalElectric had offered on Nov. 24 to purchase the municipal utility for approximately $6,000,000, the exact amount to be determined through negotiations.

According to Albert Cage, CalElectric president, the offer has been temporarily withdrawn because the present economic and engineering studies cannot be completed prior to municipal elections in April.

Cage said that the company is considering a Riverside location for extensive facilities in addition to the general office building mentioned at the time of the original proposal. An estimated $18,000,000 will be spent.

Father reads the paper by candlelight tonight!

Reading the evening paper by candlelight is no joke. When bad weather brings down distribution lines, customers' blood pressures go up and loads drop. Public relations programs suffer correspondingly.

That's why weatherproof line wires in utility distribution systems are being replaced by messenger-supported, insulated aerial cables. These cables will operate safely and dependably even with broken poles.

Simplex Aerial Cables use Anhydrex insulation for long-lived physical properties, and for mechanical and electrical stability in water. Simplex-compounded neoprene provides a lightweight, tough jacket that withstands prodigious punishment.

To minimize the chance that father will read his paper by candlelight tonight, or any night, investigate messenger-supported, Anhydrex-insulated, Simplex Aerial Cables. Write today to the address below for Catalog No. 1006.

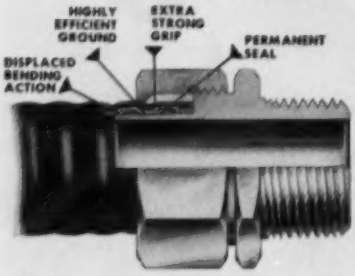
Simplex WIRE & CABLE CO.

79 Sidney Street, Cambridge 39, Massachusetts

New

LIQUID-TIGHT CONNECTOR

for flexible conduit



PYLE-NATIONAL

"CT" series Connectors offer all these advantages

EXTRA STRONG GRIP
- Compression force applied against body shank—not against the conduit alone, making a vise-like clamp.
- Gripping is well behind end of flexible conduit for firm anchorage.
- Pliable seamless sleeve makes a plastic-to-plastic grip with the conduit sheath . . . thereby avoids cutting and abrasion common to metal sleeves.

PERMANENT SEAL
- Plastic Sleeve and Conduit Sheath have equivalent physical characteristics therefore the seal will last the life of the conduit.

HIGHLY EFFICIENT GROUND
- Less than 10 millivolt drop.
- Tapered body shank, makes a firmly wedged contact with the flexible metal conduit.

DISPLACED BENDING ACTION
- Tapered body shank is elongated to extend beyond gland nut, thus avoiding short radius bends which shorten the life of the conduit sheath and the permanency of the joint.

"CT" series connectors can be installed assembled. Available in Straight, 45° and 90° types for ⅜" to 2" conduit. Meet U/L and J. I. C. standards.

Write for literature and names of authorized distributors in your area.

THE PYLE-NATIONAL CO.
1334 North Kostner Avenue
Chicago 51, Illinois

COLUMBIA BASIN GROUP TO HAVE NEW CHARTER

Interests of local governments and private agencies involved in utilization of river basin water and land resources will be represented in coordination work of the Columbia Basin Interagency Committee under its new charter. Individuals representing local interests are to be allowed to participate in meetings and accept membership on subcommittees.

Revisions already approved by the President's Interagency Committee were outlined to CBIAC by Chairman William A. Pearl at the 79th session in Walla Walla, Wash., Jan. 19.

Establishment of a permanent staff, replacing the present system of borrowing technical assistance from state and U. S. agencies, will be authorized. The purpose would be to coordinate subcommittee activities and prepare survey recommendations for appraisal of the entire CBIAC membership.

Operation of the new federal watershed protection and flood prevention act of 1954 was outlined by Carl B. Brown, director of planning division, Soil Conservation Service. The act is intended primarily for small river watersheds and U. S. financial assistance requirements require an equitable share be assumed locally, by counties or soil districts.

The power planning subcommittee, authorized at the December meeting to plan the long-range hydroelectric, steam or nuclear power needs of the region, reported delay in getting under way until March or April. A water pollution control committee postponed its report until the next meeting while the committee took up in detail the recommendations of the fisheries steering subcommittee.

Study of an upper Columbia River fisheries rehabilitation program comparable to the multimillion dollar restoration of the lower Columbia and tributaries now under way will be asked by the Columbia Basin Interagency Committee.

CBIAC adopted a fisheries steering subcommittee report which recommended stepped-up research into the area's over-all fisheries problems along with the specific investigation of the upper Columbia rehabilitation.

Chain Curtains Tried For Fish Protection

Lives of millions of young salmon may be spared by installation of newly developed chain curtains in waters at Vancouver, B. C.

Curtains are part of a series of experiments carried out last summer by B. C. fishery engineers, working to find some means of diverting downstream salmon migrants from dangerous areas such as hydroelectric units.

Dr. J. R. Bratt, Pacific Biological Station, in charge of experiments, said most successful of several techniques tested was the hanging chain system.

Under this system, series of chains suspended from an aluminum rod are hung in water and young salmon approaching the chain curtain are forced to move aside and enter a diversion pen.

Agreement Reached on Fish Protective Plan

City of Tacoma has reached an agreement with the Washington State Fisheries Department for a fish-protective program on the South Skokomish River which is described as "unprecedented" by Robert Schoettler, fisheries director.

Schoettler hopes that the pact will set a pattern for resolving fish-passage problems at Pacific Northwest hydroelectric dams.

The agreement provides that a comprehensive fish-protective program be developed simultaneously with the design work for a new dam, Schoettler said.

"While previous efforts to minimize the effects of a dam largely have been confined to providing fish-passage facilities for adult salmon and supplemental hatchery plantings," Schoettler said, "the Skokomish program will be directed as well toward protecting downstream migrants and maintaining the natural environment at a high fish-growing level."

One phase of the fish-study project, costing the city a total of $23,000, will cover environmental conditions now existing in the Skokomish River system, including spawning-ground surveys, water flows and temperatures, and migratory patterns of the three species of salmon which originate from the river.

Engineers Sign Pact With Yakima Indians

Portland District, Corps of Engineers, has negotiated a pact with the Yakima Indian tribe under which the tribe subordinates its fishing rights in The Dalles Dam area in return for a $15,000,000 settlement. The agreement is subject to approval by the Yakima General Council, chief of the corp, Secretary of the Interior and several others. An 1855 treaty gives the Yakima fishing rights in an area to be flooded.

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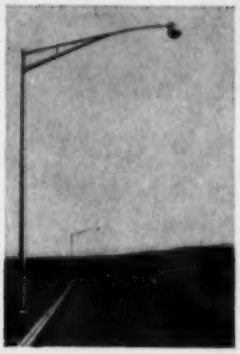

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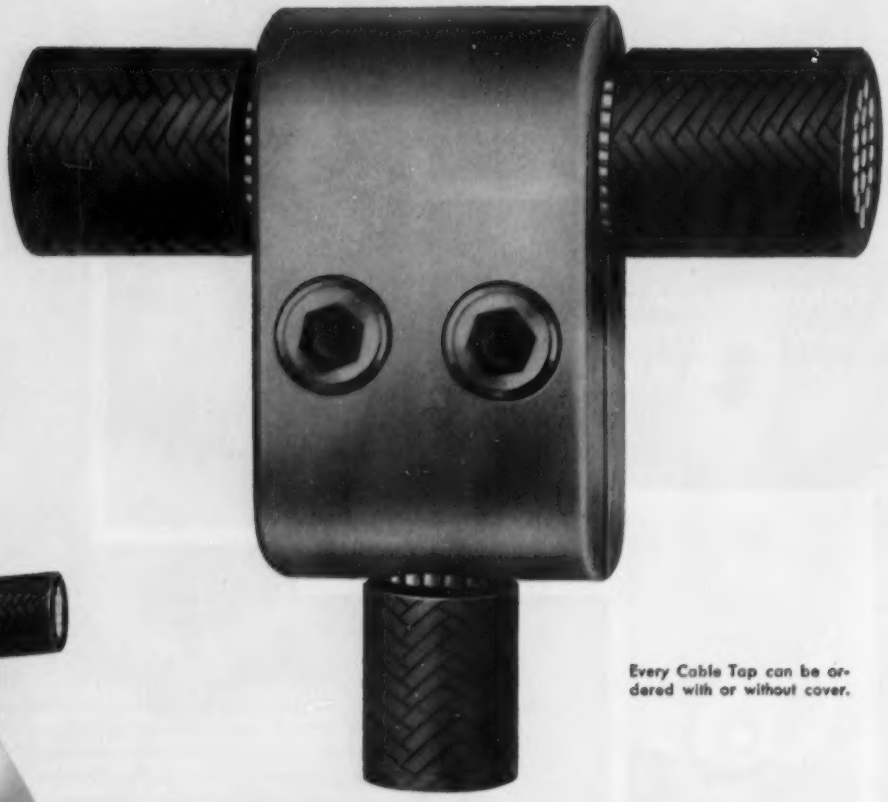

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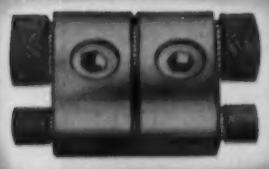

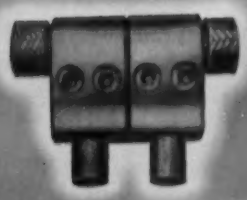

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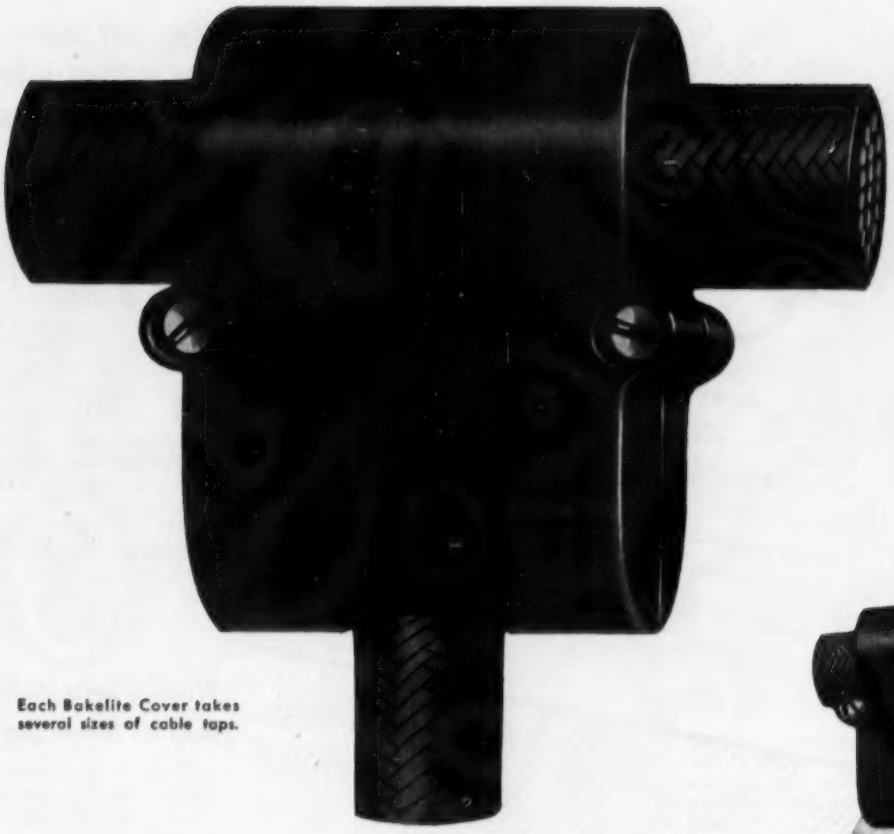

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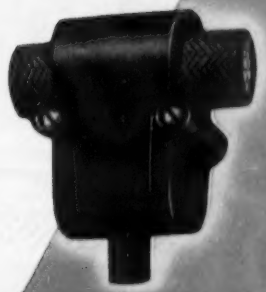

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COMPANY MAKES OFFER FOR OROVILLE POWER

Pacific Gas and Electric Co. has offered to pay the State of California 8 mills per kwh for power generated at Oroville Dam, part of the proposed $1.2 billion Feather River Project in northern California, according to State Engineer A. D. Edmonston.

Estimates released by the state department of public works show the state would gross $13,500,000 a year on sale of Oroville power. However, when the water development project is completed, some 40 years from now, the state would have to buy $45,800,000 worth of power a year to operate pumps that will deliver water through a series of canals to southern California.

The Oroville plant will produce 410,000 kw but 2,000,000 kw will be needed ultimately to operate the project. Oroville Dam and power plant would be first units built.

Working Scale Model Built for Noxon Dam

Under construction by Washington State College is a working scale model of the $85,000,000 Noxon Rapids hydroelectric dam proposed by Washington Water Power Co. of Spokane. It is believed to be the first constructed in the Pacific Northwest to a scale of one to 50.

A hydraulic model of the Clark Fork River site has been completed at WSC, duplicating some 3,000 ft of the river on both sides of the rapids, from cross-section surveys made of the site by Ebasco Services Inc., design engineers on the project. Water flow over the site can be controlled from zero to a volume exceeding any flood on record.

First tests, scheduled to begin soon, will be to study diversion of the river during the construction phase. The engineers plan to use the model to check capacity of the spillway gates as presently designed to see if they will handle maximum flow and check on erosional effects on the earthfill embankment that will be constructed at each end of the concrete dam.

• **Authority** has been issued by the B. C. Government to the B. C. Power Commission to proceed with construction of a 105,000-hp development at Ladore Falls on Campbell River at a cost of $9,700,000. The project will be in two stages, involving the creation of two 35,000-hp units initially and a third unit as required. The project will operate by remote control from the John Hart development further downstream.

SURGICAL LINE CLEARANCE BY DAVEY

Davey is doing line clearing for 12 Public Utilities on the Pacific Coast —most of them served continuously for over 20 years. Davey specialized equipment and efficient methods save money . . . Davey surgical pruning benefits trees—builds goodwill.

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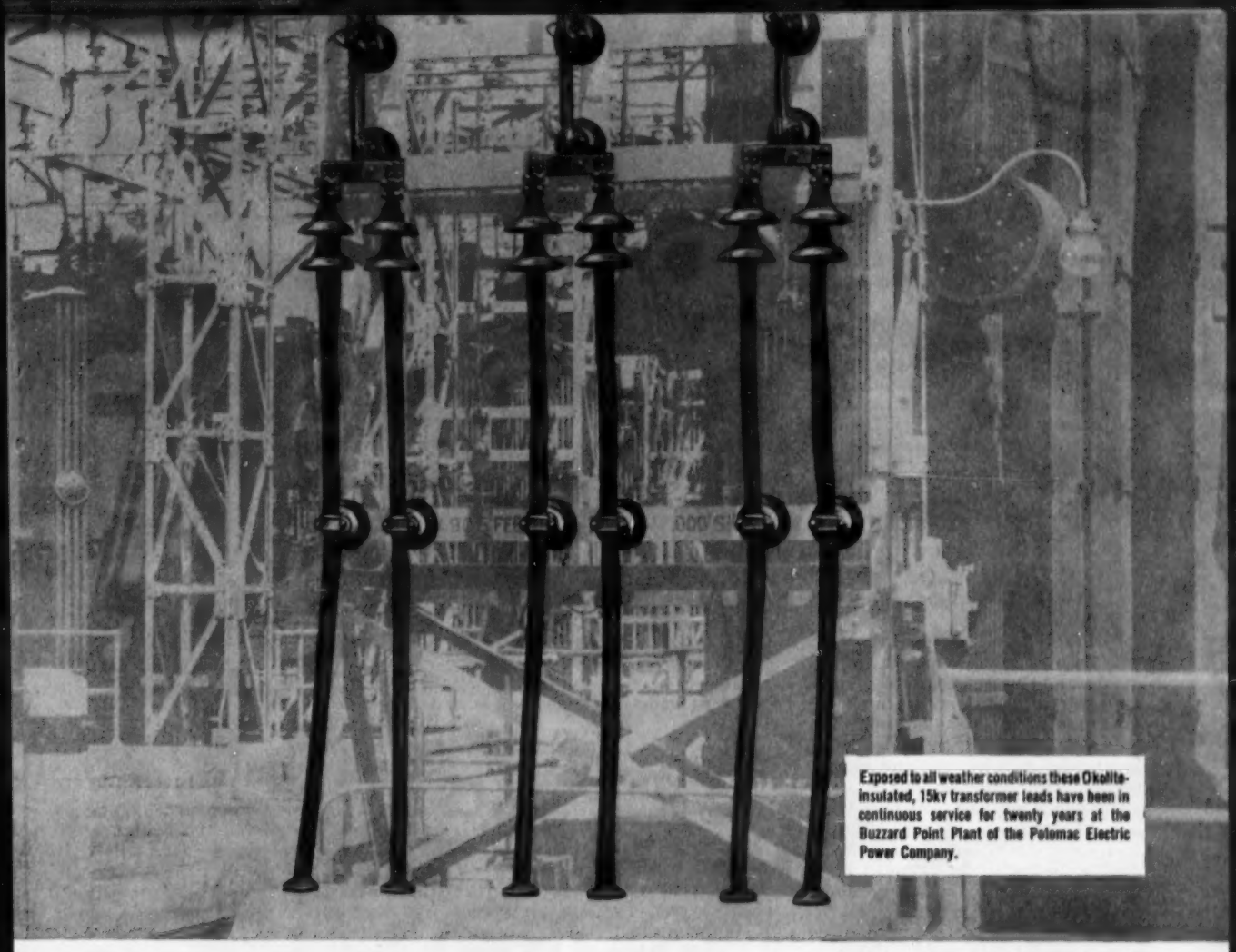
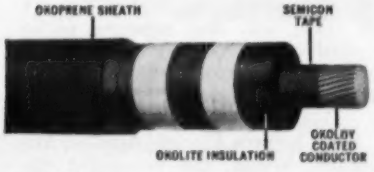


Exposed to all weather conditions these Okolite-insulated, 15kv transformer leads have been in continuous service for twenty years at the Buzzard Point Plant of the Potomac Electric Power Company.

the important cable question: *will it last?*

"Will the cable last?" With installation, maintenance and replacement costs at an all time high, cable users are making this their principal buying guide.

Okonite answers this question with



Okolite-Okoprene—a cable with a thoroughly established service record for long life. Okolite, the only oil-base rubber insulation made with natural wild Up-River Fine Para rubber, is compounded with an exclusive oil-base formula developed by Okonite in 1924. It is recommended for general use up to 35,000 volts.

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Hundreds of case histories provide positive proof of the long life and dependability of Okonite cables. One such installation is pictured above.

Next time you buy a rubber-insulated cable, be *sure* it's going to last.

To be sure: specify **Okolite** for

1. High resistance to corona cutting (ozone), moisture and heat.
2. High current carrying capacity and dielectric strength.
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CONTRACTS LET FOR WESTERN PROJECTS

Low offer of a four-company combine for phase II construction of The Dalles Dam and power house on the Columbia River has been accepted and a contract awarded, according to Corps of Engineers, Portland District. The announcement noted C. J. Montag & Sons Inc., Carl M. Halvorson Inc., both of Portland, and Cascade Contractors Inc. and Austin Construction Co., both of Seattle, had offered $12,661,246 for the work for which the corps had estimated $13,523,851. The work is the next to the last major construction on the $303,000,000 multipurpose project. Remaining major work is for 3,500,000 cubic yards of underwater fill to make possible closure of the river. Bids for this will be received in July, 1955.

San Diego Gas & Electric Co. has completed this new Eastern District office at El Cajon, Calif. The well-planned interior has space for appliance displays, with built-in lighting

• **Young & Smith Construction** Co. of Portland was low bidder, with $341,880, on an experimental fish facility at the Washington shore fish-ladder of Bonneville Dam. The facility is intended to solve problems in connection with upstream migration of anadromous fish past Columbia River dams. Emphasis on economy of design and construction will be a primary goal, according to the Corps of Engineers announcement with the call for bids. Special lighting of the experimental flume is contemplated along with a special light-proof building to control the effect of lighting.

• **Metlakatla Indian Community** of Alaska has awarded three power equipment contracts totaling more than $67,000 in connection with its Purple Lake hydroelectric project. Westinghouse Electric Supply Co. will furnish indoor metal-clad switchgear for $36,190; Wagner Electric Co. will provide four 1,250-kva outdoor-type power transformers for $20,808; Allis-Chalmers Mfg. Co. will furnish a substation structure and switching devices for $10,584. Construction has been shut down until spring, after completion of a half-mile tunnel to the headshaft at Purple Lake.

• **General contract** on Seattle City Light's 150,000-kva Duwamish substation was awarded to Buchanan, Sather & DeRyche of Seattle on a low bid of $299,423. Work is to be completed by mid-June.

• **General Electric** Co. was apparent low bidder, with an offer of $788,695, when bids were opened by Portland District, Corps of Engineers, for 15-kv system electrical equipment for the fish turbine bay generators and the first eight main units of The Dalles Dam.

Agreement Reached on Highway Lighting

Vancouver, Wash., city officials and the Washington State highway commission have reached an agreement regarding cost of installing 119 lights on aluminum poles along the new U. S. route 99 freeway. It is believed that the plan may set a precedent for lighting responsibility on limited access highways through Washington cities.

The agreement calls for the state commission to support legislation in the 1955 session requiring state payment. But if the legislative move fails, Vancouver is required to compensate the state for the $120,000 cost on basis of 15 annual installments. The multi-million-dollar freeway, slicing through an edge of downtown Vancouver, is nearing completion.

Power District Planning Street Lighting Program

A 2½-mile street lighting program for South Phoenix, Ariz., has been announced by Salt River Power District which will install the lighting at a cost of more than $22,000.

Under the plan, the district will install 110 lights spaced an average of 130 ft apart. Lights will be of the mercury-vapor color-corrected type and will be activated by a photoelectric relay.

Commercial customers will pay $2.10 per month for the service with residential customers paying 45c a month.

Some of the lights will be mounted on American Telephone and Telegraph Co. poles.

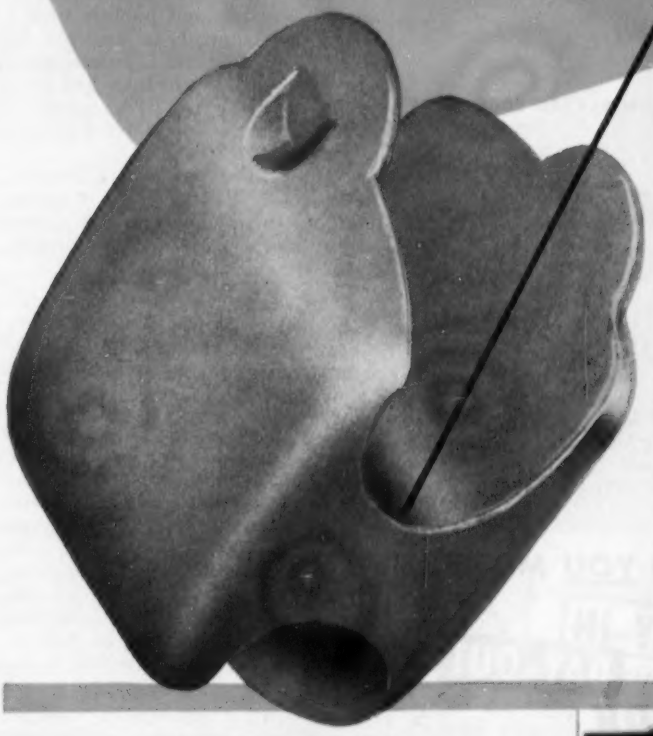
• **B. C. Power Commission** has authorized plans for increasing the capacity of its power plant at Smithers, B. C., at a cost of $250,000. A new 1,000-kw Mirrlees diesel-electric generating unit will be installed in an addition being erected to the power house. The present capacity of the power house is 1,880 kw provided by two 560-kw and one 760-kw units. The new installation will bring capacity to 2,880 kw, while new switchgear of larger capacity will be installed and the transformer bank capacity increased from 1,450- to 4,500 kva.

• **Los Angeles Department** of Water & Power has activated the second 100,000-kw generating unit at its $80,000,000 Valley steam plant in San Fernando Valley. Units number 3 and 4 are under way and expected to be finished at the end of 1955. When completed these 156,000-kw units will bring total capacity to 512,000 kw.

• **The Chugach Electric Assn.** of Anchorage, Alaska, has purchased the Inlet Power & Light Co., operating in the same area, for a reported $750,000. The consolidation gives the cooperative a generating capacity of 14,000 kw to supply 10,000 customers.

• **Pacific Power & Light** Co. received the Ebasco safety achievement award in recognition of its record during the June 1953-1954 period. The company achieved an accident injury index 29% under the national average.

The Secret is in the "built-in" Spacer



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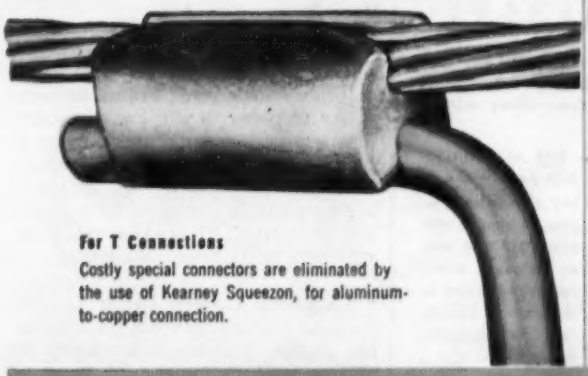
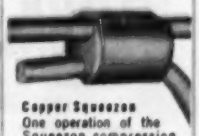


For T Connections
Costly special connectors are eliminated by the use of Kearney Squeezon, for aluminum-to-copper connection.



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FPC APPROVES BPA RATE SCHEDULES

Federal Power Commission has approved Bonneville Power Administration's rate schedules based on $17.50 per kilowatt-year through Dec. 20, 1956 and permitting readjustments that December and/or each December through 1958 to cover higher generation costs.

Administrator William A. Pearl said the approval covers schedules affecting 85 privately and publicly owned power distributors, 17 industries in the Pacific Northwest and 12 federal agencies and that all schedules had been reviewed with the BPA customers before being submitted for FPC approval in August.

Approval also was given a discount provision BPA expects will stimulate customer irrigation power loads among the utilities and a few revisions clarifying schedule applications

California Utility Granted Rate Increase

California Public Utilities Commission has authorized California Electric Power Co. to increase its system-wide rates to produce an additional $1,207,000 in annual gross revenue to offset higher operating costs. The order was effective Jan. 17.

Figured on present federal corporate income tax of 52%, the increase will net the company an estimated $553,000 after payment of federal, state and local taxes, according to the PUC.

New Program to Aid Lumber Industry

Importance of the lumber industry in the economy of the Pacific Northwest service areas of Pacific Power & Light Co. has prompted the creation of a new program by the utility to service sawmills and allied forest products industries, PP&L General Manager George T. Bragg announced.

• **California Oregon Power Co.** has received permission from the California Public Utilities Commission to make a stock exchange offer designed to retire two blocks of preferred stock issued at a time when cost of money was higher than at present. Copco will issue 121,865 shares of common, offering them on a 5 for 1 basis to holders of 7% preferred. Another 34,289 will be issued for exchange on a 4.4 for 1 basis to holders of 6% preferred. The offer will be open to Feb. 15, 1955.

FARM UTILIZATION GROUP ORGANIZES AT YAKIMA

The Inter-Industry Farm Electric Utilization Council has been organized on a regional basis at Yakima, Wash., with R. B. Smith of the Inland Power & Light Assn. of Spokane as president and Arthur Mayer of the Washington Water Power Co. as secretary.

It plans to undertake a program of sales and electrical load development to farm customers of the various power agencies, including private and public utilities, the REA, electrical contractors and manufacturers. Next meeting is scheduled for April or May in Yakima.

Participating in the first meeting were M. W. Kay of the REA, Spokane; Robert Wilkinson, Spokane, National Electrical Contractors' Assn.; R. Harold Anderson, Spokane, Washington Water Power; Lowell Shay, Eugene, Ore., Lane County Electric Cooperative; Cecil Root, Albany, Ore., Pacific Power & Light; Carl Dimmitt, Seattle, Puget Sound Power & Light; Robert Klatt, Ritzville, Big Band Electric Cooperative; Joe Miller, Nespelem, Nespelem Electric Cooperative; R. M. Turner and J. June Roberts of Washington State College.

• **Kings River Conservation District,** which embraces about a million acres in Fresno, Kings and Tulare Counties in California, has signed a three-year $80,000 cloud seeding contract in an attempt to increase the snow pack in the Kings River water shed in the Sierra Nevada Mountains. The Weather Modification Co. of Redlands will use silver iodide ground generators to seed the clouds and radar to track them. An airplane will be used to make the chemical deposits where it is not possible to do so from the ground.

• **Utah Power & Light** Co. is engaged in a "limited seeding" of clouds over the Bear River drainage area in southern Utah and southwest Wyoming. J. A. Hale, UP&L vice-president, said that services of North American Weather Consultants had been retained. He reported that, while results of cloud seeding continue inconclusive, lack of precipitation during the last two years in the Bear River Basin prompted the project.

• **Tax bill** of Portland General Electric Co. in seven Oregon counties totaled $2,725,196.47, about 13.20% above last fiscal year. Pacific Power & Light Co. paid $2,187,681 in Oregon real and personal property levies. Its Multnomah County levy, $720,344, was up 10.6%.

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NEWS ABOUT PEOPLE

Edison Announces Sales Appointment

Major changes in Southern California Edison Co.'s commercial organization were announced by G. N. Hawley, Edison vice-president.

Harold Moore, manager of the right-of-way and land department since 1948, has been appointed general sales manager, a new position in the company; A. W. Althouse, metropolitan division manager, has been named to succeed him.

Howard Hayes, advertising manager, has been appointed manager of the company's Redlands district. He has been succeeded by G. R. Haysel, formerly assistant advertising manager.

T. L. Van Law has been named manager of industrial and commercial sales and J. C. Meserve is the new manager of residential sales.

Moore joined Edison in 1925 as a merchandise salesman in Santa Barbara. He later served as heating specialist and sales supervisor in several localities and in 1942 was named Pomona district manager. Althouse joined the company in 1919 as a bookkeeper at Porterville and had been metropolitan division manager since 1952.

• **Theodore O. "Ted" Rudd,** frequent West Coast visitor, has been named president of the Kerite Co. Aside from 18 months as a cadet engineer with Philadelphia Electric Co., his entire business career has been with Kerite, which he joined as a salesman in 1926. For the past 10 years he has been vice-president. Rudd succeeds C. R. R. Harris, who has been made chairman of the board.

• **Carlton J. Daiss Jr.** has been appointed to the sales staff for Gardner Transformers in northern California and Nevada, according to an announcement from Federal Pacific Electric Co., the parent organization. Daiss is a member of the AIEE, Pacific Coast Electrical Assn. and the Electric Club of San Francisco.

• **John R. Kiely,** vice-president of Bechtel Corp., has been elected a director. Joining the organization in 1942, he was appointed general manager of the power division in 1948 and vice-president in 1951. Kiely is an engineering graduate of the University of Washington.

VanHorn

Scheyer

• **Dale VanHorn** joins ELECTRICAL WEST this month as assistant editor. He comes from Denver, where he has been with Public Service Co. of Colorado for three years. In that company's publicity department, his assignments covered writing, advertising and photography. A native of Kansas, he worked on a weekly newspaper part time while going to high school. Later stints with newspapers in Nebraska, Kansas and Colorado gave him a varied experience in that field, since his jobs ranged from advertising and apprentice printing to feature writer and part-time photographer. Of his 32 months in the U. S. Infantry all but 10 were spent in the South Pacific.

• **H. E. Chambliss** has retired as chief engineer of Montana Power Co. and will be succeeded by **Ray M. Ball,** President J. E. Corette announced recently. Chambliss has been granted a leave of absence because of ill health but will continue to be associated with the company in a consulting capacity. He joined Montana Power in 1919 and was made chief engineer in 1953. Ball was employed by G-E in Schnectady after his graduation from Montana State and joined Montana Power in 1930. After an absence from 1933 to 1935 with the state highway department he rejoined the company.

• **John D. Fess** has succeeded **C. D. Ham** as Northwest manager of the Okonite Co. with headquarters in Portland, according to I. W. Borda, Pacific Coast vice-president of the organization. Ham has been transferred to Passaic, N. J., in a staff position. Fess is a native of Ontario, Can., who received his electrical engineering degree from Rose Polytechnic Institute. Since joining Okonite in 1949 he has served as sales engineer in both Indianapolis and Cincinnati. During World War II he was an air force gunner in the Pacific theater.

Staff Changes Made By Puget Power

Appointment of Clarence Scheyer as general sales manager heads a list of personnel changes announced by the Puget Sound Power & Light Co.

With the utility for 31 years, Scheyer has been the company's industrial sales director since 1947. Coincident with Scheyer's appointment, President Frank McLaughlin announced that the company is increasing its sales organization by four more sales supervisors and four home service consultants, to assist dealers in the sale of electrical appliances.

In other changes, Howard Carter, superintendent of light and power of the company's Western division at Bremerton, became assistant to the company's operating manager. Wallace W. Quistorff, assistant superintendent of light and power of the company's Central division at Renton, was promoted to replace Carter. Charles McGarrigle, local manager of the Renton office, takes on the added duties of supervision of light and power operations.

• **Only one Westerner, John Bruce,** Southern California Edison superintendent of operations, won an honorary degree as "master in the Art of Load Forecasting" in the annual generation pool conducted by R. M. Hatfield, West Coast vice-president of Combustion Engineering Inc. Bruce placed sixth among 373 contestants with a guess that missed the estimated 1954 output of 472,215,089,000 kwh by 0.06%.

• **Robert L. Ford** has joined the Westinghouse Electronic Tube Division as a sales engineer in the South Pacific district. He previously had been with Smoot-Holman Co., Inglewood, and Southern California Edison Co.

the J2 Meter is the SLOW SPEED METER

694,450

it's as simple as – 416,666

the J2 makes fewer revolutions *and fewer revolutions mean less wear . . . longer service life!*

The J2 Watthour Meter is the *slow speed meter*. It makes fewer revolutions than other meters—including the J2's predecessor, the Sangamo Type J—to measure the same load.

Fewer revolutions mean less wear on all moving parts . . . and *less wear means longer service life.*

Here's what this means in terms of only one year's time. The J2 has a 6.0 constant. It makes 166⅔ revolutions to measure one kilowatthour. The J Meter had a 3.6 constant. It made 277.7 revolutions to measure one kilowatthour.

Today's average residential load is 2500 kilowatthours. If you multiply this figure by 277.7, you get 694,450—the number of revolutions a 3.6 constant meter must make in order to measure 2500 kilowatthours.

Let's multiply 2500 kilowatthours by 166⅔, the speed of the J2 Meter. Here we get 416,666 revolutions per average load per year. And the difference between 690,450 and 416,666 is 277,784. In other words, the J2 makes 277,784 *fewer* revolutions in a year to measure the *same* load.

While the total fewer revolutions the J2 makes in only a year's time is impressive, think what it would add up to by 1985! Doesn't it stand to reason that there will be less wear on the moving parts of the J2? And with less wear on moving parts, it just naturally follows that the J2 will give many more years of trouble-free service.

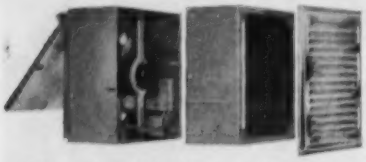
the FIRST watthour meter with straight line accuracy up to 100 amperes!

SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

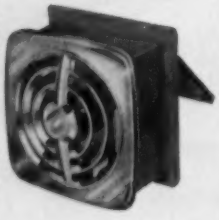
JM55-2

Broan
LEADS with Motordor EXHAUST FANS



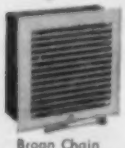
Motordor Automatic Fans in 12", 10" and 8" sizes

No other Exhaust Fan has all of the BROAN Motordor features. No. 11C Fan (10") with "FANTOM GRIL" and No. 840C (8") with Venturi-Design grille are illustrated. Fan motor and Outer Door motor both are controlled by a single switch for automatic operation.



Why BROAN Exhaust Fans are preferred

Every modern advance in home ventilation is represented in today's complete line of BROAN Ventilating Fans. In addition to the fully automatic MOTORDOR Fans, the BROAN line includes 8", 9", and 10" Chain Control Wall Fans, and 8" and 10" Ceiling Fans — adapted to every possible installation requirement in kitchens, bathrooms, nurseries, recreation and utility rooms, regardless of size.



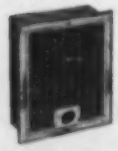
Broan Chain Control Fan with "FANTOM-GRIL" — No. 6C

"FANTOM-GRIL" is exclusive

"FANTOM-GRIL", the only grille that conceals fan interior from view, makes possible the greater volume and efficiency of airflow.

Broan 8" Ceiling Fan No. 872

Distinguished by modern design, top-ranking quality, and an outstanding quarter-century record of satisfactory service in hundreds of thousands of homes, BROAN equipment . . . including fan-type electric heaters . . . is recognized as the leading preference of Architects, Electrical Contractors, Builders and Homeowners.



Broan Electric Heater No. TU-15. Thermostat Control.

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1673 NORTH WATER STREET
MILWAUKEE 2, WISCONSIN

• **Pacific Power & Light** Co. has named **Deskin O. Bergey,** division sales manager in Portland and past president of the Oregon Electric Club, to a new position of district manager for the company's Coos Bay area. Bergey relieves **J. W. Asplund,** retiring after 38 years with the utility. The area was acquired by PP&L in its merger with Mountain States Power Co. Bergey joined the company 20 years ago as a commercial lighting salesman.

• **O. E. Osgood,** assistant superintendent of the White River power plant of Puget Sound Power & Light Co., has retired after 44 years with the company. For all except two years of that time, he was a weather recorder, making him the oldest recorder in point of continuous service in the state.

• **John Brosius,** formerly superintendent of the Leadville division, has been appointed distribution staff engineer for Public Service Co. of Colorado. **Keith Potter** was made Leadville superintendent. **Ralph Hancock** was named superintendent of Georgetown, Colo., hydro plant to succeed **William Reichwein,** retired.

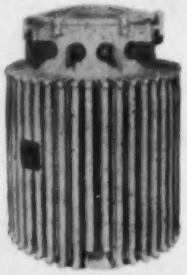
• **Robert J. Tallman** has been appointed district manager of the Bonneville Power Administration at Wenatchee, Wash., to succeed **Howard Elmore,** who resigned to join the staff of the Chelan County PUD at Wenatchee. He formerly was customer service representative in the Northwest area office in Seattle.

• **Merle Bell,** order service manager for Westinghouse Electric Corp.'s Sunnyvale, Calif., plant, recently completed 45 years of service with the organization. He joined Westinghouse at East Pittsburgh, was transferred to Emeryville, Calif., in 1927 and to Sunnyvale 20 years later.

• **Austin Little,** general sales manager of Prescolite Mfg. Corp., Berkeley, Calif., has been transferred to the company's Eastern division in Neshaminy, Pa. **Preston A. Jones,** Prescolite president, who supervised the building of the Neshaminy plant, has re-established his offices in Berkeley.

• **Hugh X. Sheeter,** manufacturers' representative, Los Angeles, described a trip he and **Leonard A. Hobbs,** vice-president, Smoot-Holman Co., Los Angeles, made to Guatemala just at the conclusion of the recent insurrection to the Los Angeles Electric Club at its Jan. 17 meeting. It was illustrated with color movies and 3-D color slides.

MEET THE NEW
167 KVA
Featherweight
PENNSYLVANIA POLE STAR DISTRIBUTION TRANSFORMER



★ Will replace any single phase 75 or 100 Kva Pole-mounted Transformer to provide 67% to 123% more capacity.
★ Weighs less than 1500 pounds
★ Lower in overall height than average 100 Kva transformer
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★ The FIRST 167 Kva transformer made for direct pole mounting.

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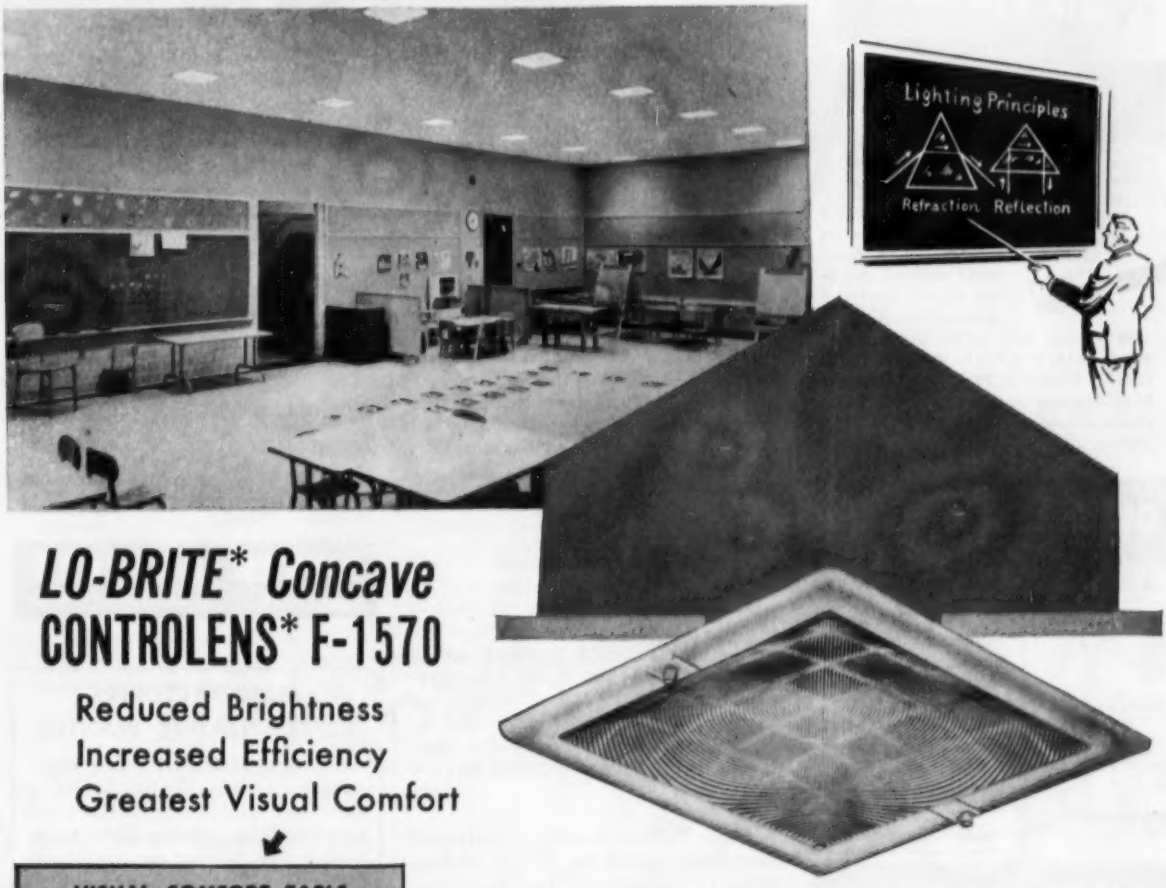
Look for ELECTRICAL WEST's April Industrial Electrification issue — articles and pictures of outstanding Western installations featuring new methods and techniques.

HOLOPHANE Develops Scientific Lighting for the LOW CEILING CLASSROOM



*LO-BRITE** Concave CONTROLENS* F-1570

Reduced Brightness
Increased Efficiency
Greatest Visual Comfort

VISUAL COMFORT TABLE
VCF Values for 200 Watts

ROOM WIDTH (in feet)	ROOM LENGTH (in feet)	CEILING HEIGHT 10'	CEILING HEIGHT 13'
20	20	98%	99%
	30	98%	98%
	40	97%	97%
	60	97%	97%
	80	96%	96%
30	40	97%	97%
	60	97%	97%

This table indicates the percentage of normal observers who may be expected to experience visual comfort when seated in the least favorable visual position in the room.

*Reg. U. S. Pat. Off.

The constant demand for economical construction has spurred a wide-spread trend to the one-story, low-ceilinged school . . . The lower ceilings created a new set of problems, which have challenged the foremost lighting experts. Holophane Engineers, after intensive research, presented the solution in the F-1570 Series, now in use by many new schools across the nation.

Through a new optical design, Holophane F-1570 units offer these advantages:

(a) They take the *direct* glare out of direct lighting.
(b) They provide the most effective lighting of the kind needed by teachers and pupils — maximum visibility with highest comfort.
(c) They cost *less* — because they serve *longer* — at lower operating expense.

Holophane

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THE HOLOPHANE COMPANY, LTD., THE QUEENSWAY, TORONTO 14, ONTARIO

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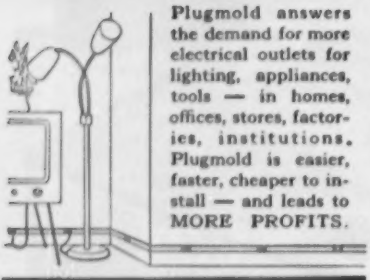

Plugmold answers the demand for more electrical outlets for lighting, appliances, tools — in homes, offices, stores, factories, institutions. Plugmold is easier, faster, cheaper to install — and leads to MORE PROFITS.

SALES unlimited

For NEW WIRING or REWIRING, Plugmold is the most economical, modern way to provide plenty of outlets. Once your customers try Plugmold in the kitchen, they'll want it *in every room.* Install the Kitchen Package in your own home and see for yourself.

WIREMOLD'S Full Profit Line
Builds Better Business for YOU

WIREMOLD Surface Raceways
PANCAKE Overfloor Raceways
WIREMOLD Fluorescent Units

THE WIREMOLD COMPANY
Hartford 10, Conn.

• **William M. Walker,** British Columbia electrical engineer, has been named to go to the Chalk River, Ontario, Nuclear Project to help carry on research in the application of the atom to industry in Canada. In announcing the appointment, B. C. Electric Co. President A. E. Grauer said that Walker will be on loan from the company for about two years.

• **John Reine,** formerly on the West Coast, has been made assistant district manager at Chicago by Graybar. He joined the company in 1927 at Seattle and was transferred to Minneapolis in 1951 after serving as branch manager at Tacoma and at Portland.

Deaths

• **Oliver Emick Grant,** formerly Western division electrical engineer for General Cable Corp., died at his home in San Francisco last month. A graduate of Columbia University's electrical engineering school, he joined Safety Insulated Wire & Cable Co. and later General Cable Corp. In 1930 he was named division engineer for the eleven Western states.

• **Harry L. Jackman,** 85, who worked for several years in Thomas A. Edison's laboratory and was sent West to install an electric power system at Republic, Wash., died at his home in Eureka, Calif., Jan. 8. He was manager of the North Mountain Co. and subsequently of the Eureka branch of the Western States Power Co. until it was sold to Pacific Gas and Electric Co.

• **Dave William Gratz,** 45, principal electrical engineer for the city of Burbank Department of Public Service, died Jan. 13 at his home. Mr. Gratz began as an engineering aid, became senior electrical engineer in 1952 and was appointed to his last post in September 1954. As principal electrical engineer, Mr. Gratz had charge of planning and building electrical distribution systems for Burbank.

• **W. K. McKenzie,** 75, former president of the Puget Sound PUD Commissioners Assn. and a member of the Chelan County PUD commission since it was formed in 1936, died Jan. 11 at his home in Manson, Wash.

• **E. W. Anderson,** 62, chairman of the Washington State Public Service Commission, died Jan. 4 at Olympia. An attorney, he was supervisor of the State Department of Transportation before being named to the commission in 1951. He has been chairman for the past two years.

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We design and manufacture all kinds of special transformers

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Also rewinding, redesign, general service and repair

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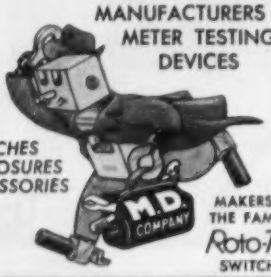
LARGEST EXCLUSIVE MANUFACTURERS OF METER TESTING DEVICES



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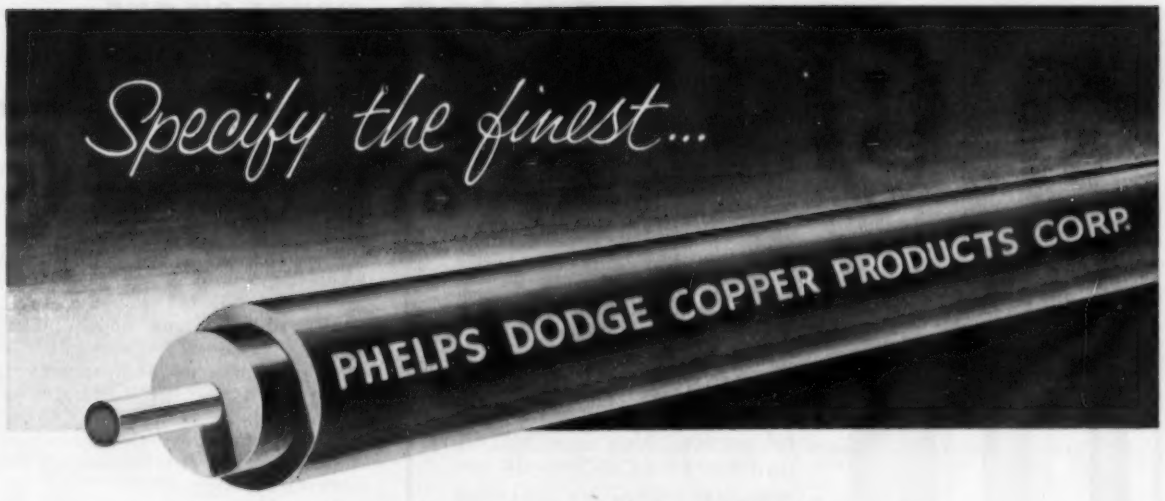

Phelps Dodge Habirite-Habirprene!

Rely on this highest quality cable— it works where others fail

The term "RR" is only a name, not an assurance of quality. Instead of ordering just "RR" cable, insist on Phelps Dodge Habirite-Habirprene—developed through years of experience in designing and making high voltage cables. Habirite-Habirprene exceeds the trade's highest standards of quality and reliability.

Phelps Dodge Habirite insulation, a specially engineered butyl rubber compound, has a service dependability record unapproached by any other type of rubber insulation. Habirite is greatly superior to old-fashioned insulations for these reasons:

- Much greater resistance to heat and oxidation. This permits a higher temperature rating, with consequent reduction in conductor size and in cable cost.
- Much greater resistance to ozone—present around high voltage equipment.
- Much greater mechanical toughness affording maximum protection against damage from tools, stones and other installation hazards.
- Better electrical properties—giving a greater safety factor in operation.
- Maximum uniformity of finished product—due to controllable uniformity of raw materials.
- Elimination of seams which cause weak spots—through use of Phelps Dodge extrusion insulating process.

Phelps Dodge Habirprene sheath, a unique neoprene compound, is especially made to be extra resistant to corona, one of the worst enemies of high voltage cable. This *extra resistance to corona* is an exclusive Phelps Dodge feature. It provides a greater safety factor in operation and has contributed to the remarkable reputation and service record of Habirite-Habirprene.

When you specify Habirite-Habirprene, you are assured of getting "RR" cable with the utmost in safety and durability. Habirite-Habirprene is the result of Phelps Dodge's rigid quality standards, long experience, expert engineering and vast facilities.

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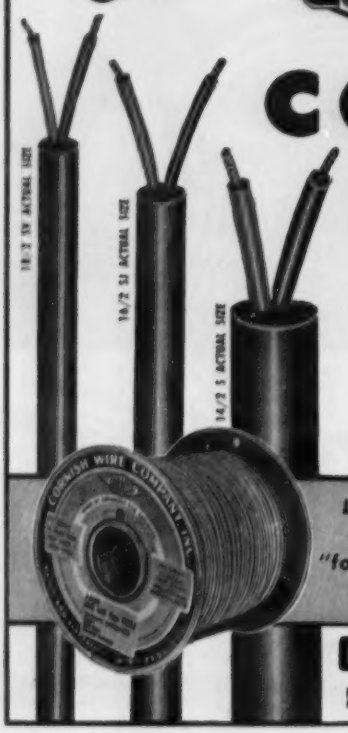

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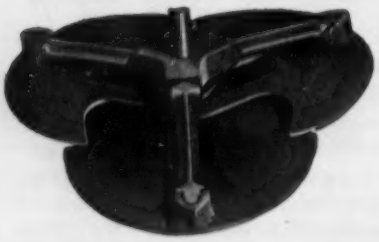

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NOTES ON THE TRADE

Manufacturer Completes Modernization Program

Hubbard & Co. has completed a $500,000 expansion and modernization program at its Emeryville, Calif., plant. Additions and improvements will increase productive capacity substantially and enable the company to keep pace with greatly accelerated industrial activity on the West Coast, Vice-President Marshall Lasher said in announcing completion of the modernization.

The addition is the fifth since the 112-year-old firm started its Emeryville operation in 1924. The recent program added 40,000 sq ft of floor space including a new building for galvanizing operations and additional rooms for storage of raw materials and assembly operations. Also included in the expansion was installation of new machinery.

• **Expansion** of its Pacific Coast merchandising organization was announced by the Johns-Manville Industrial Products Division. **Arthur W. Knight** has been made Pacific Coast merchandise manager and **Johan H. Peterson** will continue as Pacific Coast staff manager for Transite, Asbestos-cement, pipe products. Other Pacific Coast appointments announced by Vice-President F. J. Wakem were promotion of **Lawrence M. Osborn** to staff manager for industrial products other than Transite pipe and of **H. C. Bruner** as staff engineer. Headquarters for merchandising operations are in the company's San Francisco offices.

• **Albert N. Semmelroth** has been made manager of the Torrance, Calif., plant of National Electric Products Corp., succeeding **A. D. Freshman,** retired, it was announced by President W. C. Robinson. Semmelroth had been chief engineer of the Busway Division at Elizabeth, N. J.

• **A. L. Berg Electric Corp.** held open house at the new offices built at 5850 Venice Blvd., Los Angeles. Berg is chairman of the Business Development Committee for the Los Angeles Chapter of NECA.

• **Anderson-O'Donnell** Co., 2980 S. Steele St., Denver, has been appointed representative for Utah, Colorado and New Mexico by Slater Electric & Mfg. Co. Inc. of Woodside, N. Y., manufacturer of wiring devices.

• **Hugh L. Bargion,** Honolulu, has been appointed representative in Hawaii for Spang conduit, manufactured by the Spang-Chalfant Division of National Supply Co. Bargion set up his own business in 1953, after being manager of the electrical supply department of American Factors Ltd. He had previously been with Westinghouse Electric Corp. and Washington Water Power Co. on the mainland.

• **Management** of Gardner Electric Mfg. Co. of San Francisco will be under the direction of **Howard D. Tindall,** according to Thomas M. Cole, executive vice-president of Federal Pacific Electric Co., which recently acquired the firm. Tindall has been made manager of Federal Pacific's transformer division.

• **Malleable Iron Fittings** Co., Branford, Conn., has announced that **Ogden W. Sutro,** former sales manager of the Pole Hardware Division, is now assistant to the president and **Albert B. Stevens** has been made sales manager.

• **Macdonald Equipment** Co. Inc., 1068 Santa Fe, Denver, has been named distributor for FWD trucks for the state of Colorado, according to G. F. DeCoursin, vice-president in charge of sales for Four Wheel Drive Auto Co.

• **A. A. Osipovich,** former chief of transmission design section for Bonneville Power Administration, has established a consulting engineering office in Portland. Osipovich, who before leaving BPA had directed design of towers for the system's new 345-kv lines now under construction, was with the federal power agency 16 years and before that was on the Bonneville Dam design staff.

• **Thomas & Betts** Co. is in new San Francisco headquarters at 645 Phelps St. The new building covers 5,000 sq ft, twice the floor space of the previous location. It also serves as district sales headquarters for the northern California area. **E. L. Johnson** is San Francisco district manager.

• **Joseph E. Harling** has announced that **Mrs. Cynthia M. Cleveland** has purchased his stock in the Wire Co. of America and that he has resigned as president and general manager and as a member of the board of directors. The company is located in Santa Barbara.

• **Safe-T-Seal** Division of MB Aircraft Services has moved into new headquarters at 3100 Vanowen St., Burbank, Calif.

Why Pay 3 MEN to Watch Your Line Crew Work?

START SAVING TIME and MONEY with

TEL-E-LECT 2-MAN UTILITY RIGS

If you're using 5-man crews and old fashioned utility equipment (even on '55 chassis) you've got *three extra men on most jobs!*

With Tel-E-Lect equipped trucks you'll discover the great time and money saving advantages of 2-man construction trucks. Leading public utility companies throughout the country are now using 2-man trucks to do a large share of the work once performed by 5-man crews—and they're realizing increased profits in the process.

Your 2-man crew won't work any harder, but they'll produce more and do it faster than many 5-man crews. You see, Tel-E-Lect builds the services of three men into its utility truck equipment. Tel-E-Lect equipment provides new power features that require only two men to perform the tasks once done by five!

The 2-man construction equipment described here lets you put smaller crews on everyday jobs while freeing big crews and big equipment for the really tough highline jobs.

THE TEL-E-LECT COMBINATION BODY

This *complete* package consists of a rugged steel body, stowaway derrick, winch and drive, pole hole digger and drive and rapid forward-reverse transmission. Three simple installation steps by your local mechanic puts the Combination Body on your truck chassis regardless of make or model. You simply install power take-off . . . mount body and connect power drive . . . and install cab controls. It's now ready to go to work!

A Tel-E-Lect all steel Combination Body is completely equipped with Stowaway derrick, digger and power units—a model 2-man construction truck.

Front mounted Tel-E-Lect "T" frame derrick and Tel-E-Lect Pole Hole Digger gives this utility truck 2-man versatility.

WINCH, DIGGER AND DRIVE KITS FOR ALL POPULAR-MAKE TRUCKS

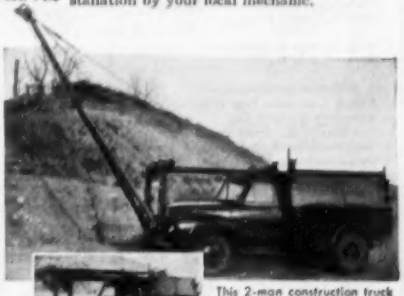
A series of easily installed Tel-E-Lect kits make it possible to install derricks, diggers and power drives at the front of your present utility truck. The flexibility and economy of 2-man operation can be extended to any size or model of International 4x4, Ford, Chevrolet, GMC, Dodge or other truck.

These Tel-E-Lect kits are designed specifically for the particular truck on which they will be installed. Each kit contains every part needed for easy installation by your local mechanic.

TEL-E-LECT SELF-STORING DERRICK CONVERSION KITS

An entirely new concept of derrick storage eliminates the hazards once involved in derrick erection and take-down. Your front mounted "A" or "T" frame derrick stores on top of the truck—doesn't use valuable body space for storage.

Your truck's winch supplies power to raise or lower derrick. With a double drum winch you'll get "live-boom" flexibility and with a single drum winch you'll get easily adjustable derrick elevation! This low cost unit fits any truck with or without body and is quickly installed.



This 2-man construction truck features a front mounted Tel-E-Lect T-45 derrick and Tel-E-Lect Self Storing Derrick Conversion. The derrick is shown in its stored position in the smaller photo.

Tel-E-Lect provides other kits for individual requirements. Write us about any of your utility truck problems.

TEL-E-LECT PRODUCTS INC.

TEL-E-LECT PRODUCTS, INC.

10,025 Minnetonka Blvd., Minneapolis 16, Minnesota

Dealers: Am. Equip. & Body Co., Los Angeles . . . Utility Body Co., Oakland, Calif. . . . Cole Commercial Co., Seattle . . . Williamson Body & Equip. Co., Ogden, Utah . . . Sagvara Body & Equip. Co., Phoenix

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PROFILES

Negotiators of the Columbia Interstate Compact signed the document at Portland Jan. 15. Seated left to right: Charles H. Heltzel, Oregon; Hugh A. Shamberger, Nevada; F. A. Banks, Grand Coulee, Wash., representing the U. S. government; L. C. Bishop, Wyoming. Standing: J. V. Rogers, Washington; R. P. Parry, Idaho; L. I. Wallace, Montana. See p 148

Freeland Creech

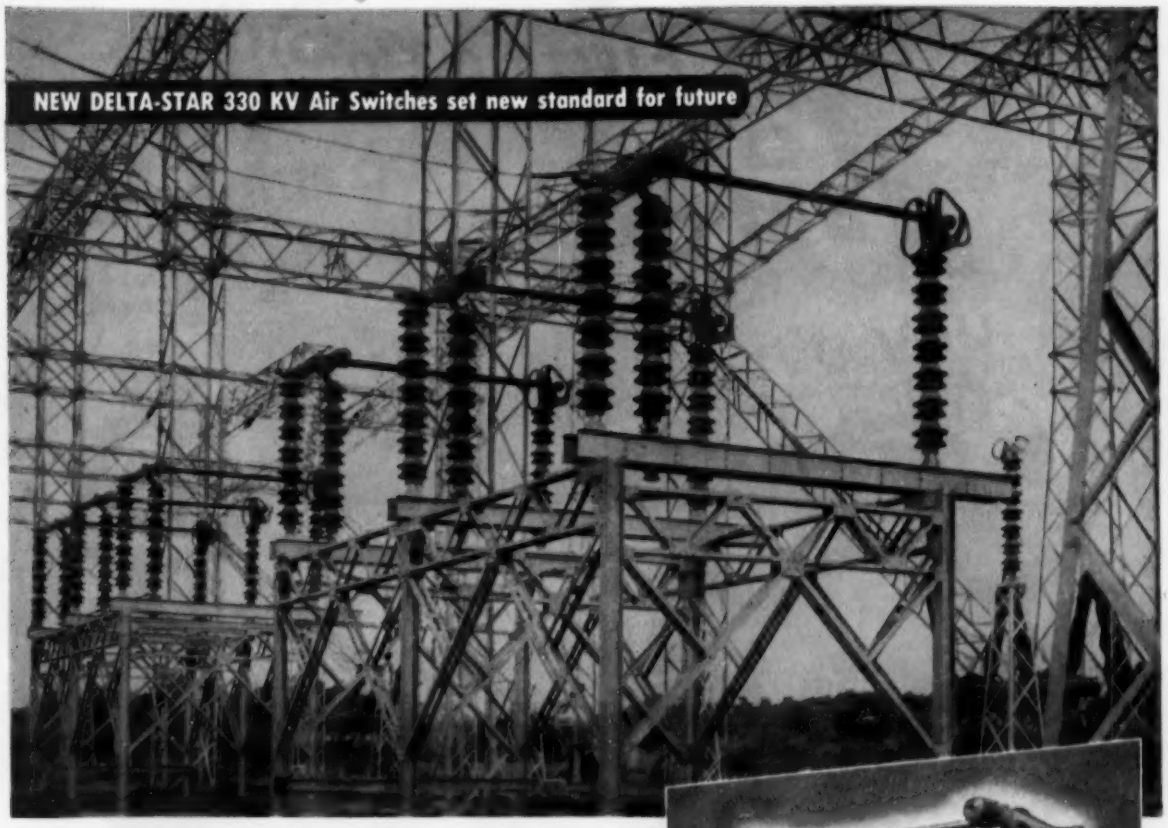
Executives from Westinghouse Electric Appliance Division headquarters at Mansfield were in San Francisco last month for the Western Winter Market. Vale E. Freeland, director of department and furniture store sales, was a luncheon speaker. W. B. Creech is assistant division manager at Mansfield

Edwin W. Meise was appointed recently as manager of sales for San Diego Gas & Electric. With SDG&E since 1923, he had been superintendent of residential electric sales

Walter D. Howell was made manager of agricultural sales and special accounts for Pacific Gas and Electric. He had been East Bay Division sales manager for the company

Howell

Meise

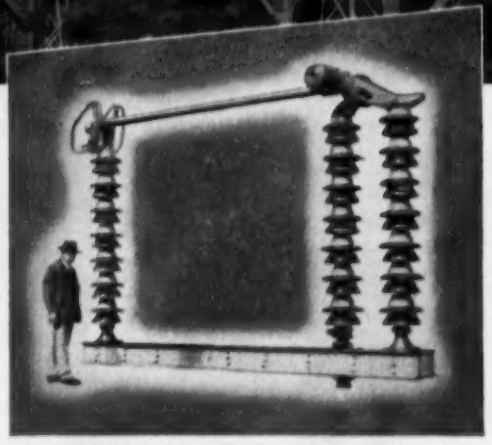


How soon will your future be in this picture?

These new ultra high voltage switches, the first to be ordered and built in this country, are now installed and ready for service. They are the forerunners for handling heavy power loads of the future.

Built along the same basic principles as lower voltage MK-40 switches, which have become the standard of comparison, these 330 kv switches set a new standard for *ultra high voltage* service. They also represent the advantages offered all utilities through DELTA-STAR specialization in carefully engineered, specially designed high voltage switching equipment.

Whether you now need switches of high voltage ratings, high current ratings or normal ratings, your preferred source, more than ever, is DELTA-STAR.



DELTA-STAR 330 kv, 1600 Ampere MK-40 Air Switch

This giant size switch has every feature incorporated in all DELTA-STAR MK-40 switches. Included are rugged high pressure contacts construction and efficiency, simplified blade actuating mechanism, a minimum number of current inter-change surfaces and ease of operation.

DELTA-STAR MK-40 switches are available in voltage ratings from 7.5 to 330 kv, and current ratings from 400 to 5000 amperes.

When you want the best in high voltage switching equipment—specify DELTA-STAR

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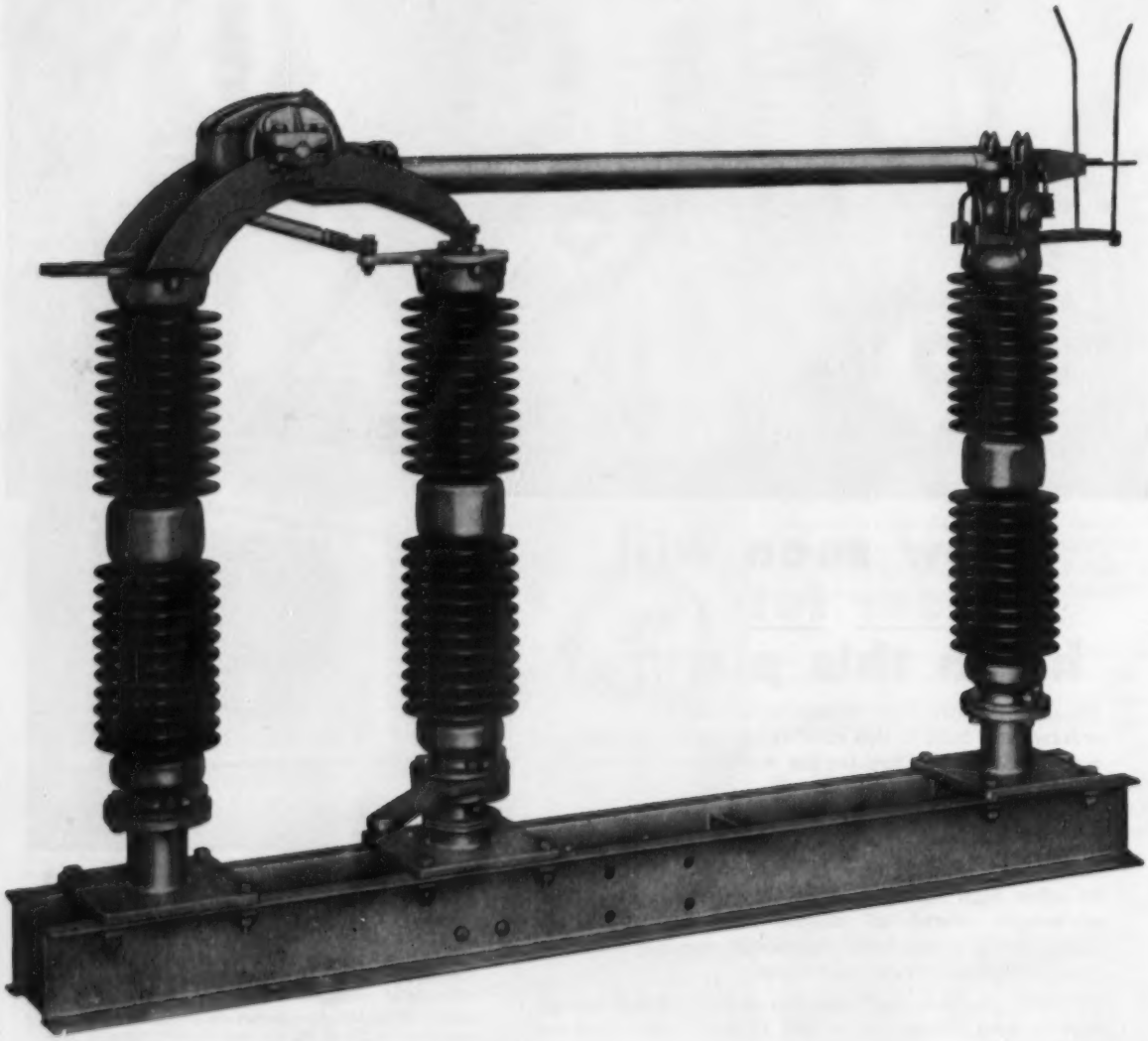

AIR BREAK DISCONNECTING SWITCH
69,000 Volts—1200 Amperes
Type 0-2
Vertical Break, Three Pole, Single Throw
Group Operated—One Pole Shown
HIGH PRESSURE SILVER TO SILVER CONTACTS
See Bulletin 46-A

When the lights go blinkety-blink..
it's probably a sign of inadequate wiring!
There you are with the lights on bright—until somebody turns on an appliance. Suddenly, the lights do a quick flicker! This annoyance happens in four out of five homes. Because today's house has more lighting, more appliances than the wiring can provide with adequate current. (This is true even in new homes!) To get full power from the lighting and appliances you have now—or plan to add later—why not see a qualified electrical contractor about adequate wiring for your house?* New wiring as well as appliances can be financed on easy bank terms. If you're building, ask for a "Certificate of Adequate Wiring"—proof of a first-class job.
Electricity is cheap in California!
P·G and E
Pacific Gas and Electric Company
*For a list of qualified electric contractors in your community, write the Northern California Electrical Bureau, 1355 Market Street, San Francisco 3
when fuses blow and leave you in the dark
...it may be time to have your home wiring system checked!
A blown fuse is a nuisance. But too many re-fusings may be a warning that the wiring in your home can't handle all the appliances and lighting. In 4 out of 5 homes (new ones not excepted) wiring is inadequate. To make sure your home is wired safely—and can provide all the electric current you need for the appliances you have now—or plan to add later—why not call in a qualified electrical contractor?* New wiring—as well as appliances—can be financed on easy bank terms. If you're building, ask for a "Certificate of Adequate Wiring"—proof of a first-class job.
Electricity is cheap in California!
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For a list of qualified electric contractors in your community, write the Northern California Electrical Bureau, 1355 Market Street, San Francisco 3

PROMOTION NEWS from P.G. and E.

This month, Northern and Central Californians will read these P. G. and E. promotional advertisements and when Californians buy and use more modern appliances, everyone profits . . . in business, in industry, in the home. For P. G. and E.'s low-cost gas and electricity can thus do more work, provide more of the comforts of life.

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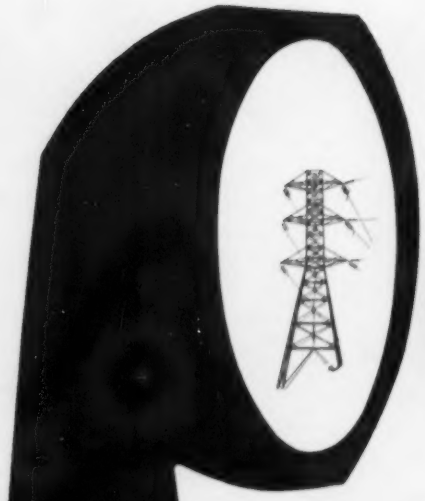
Gas and electricity are cheap in California



This is P.C.E.A. calling.

If you are a part—*any* part—of the electric industry in the west, the call is for *you*. And it's important.

Pacific Coast Electrical Association is the organization of men and women in the electric industry who are out to achieve better days *for* the electric industry. And they have proved that concerted action on a planned program is the key to success. It's a "do something" organization, with a fine record of valuable accomplishments in its past and a lengthy list of specific objectives on the agenda for the future.

You belong! There's a definite place for you in the reaching of those objectives. And we urge you to take an active part in the phase of our program best suited to your own likes and talents. Get full information from either of the P.C.E.A. offices.

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